



PATENT
P56934

**IN THE UNITED STATES PATENT AND TRADEMARK OFFICE
BEFORE THE BOARD OF APPEALS AND INTERFERENCES**

Appeal No. _____

In re Application of:

Confirmation No. 8457

Richard G. Hyatt, Jr.

Serial No.: 10/630,759

Examiner: Barrett, Suzanne Lale Dino

Filed: 31 July 2003

Art Unit: 3673

For: ELECTROMECHANICAL CYLINDER PLUG

Attn: Board of Patent Appeals & Interferences

Paper No. 27

APPEAL BRIEF

Mail Stop Appeal Brief-Patents

Commissioner for Patents

P.O.Box 1450

Alexandria, VA 22313-1450

Sir:

In response to the Notice of Panel Decision from Pre-Appeal Brief Review dated 26 November 2010 (Paper No. 20101115) and pursuant to Appellant's Notice of Appeal filed on 30 September 2010, Appellant hereby appeals to the Board of Patent Appeals and Interferences from the rejection of claims 9-12, as set forth in the final office action mailed on 30 March 2010 (Paper No. 20100325).

Folio: P56934

Date: 3/28/11

I.D.: REB/kf

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I. REAL PARTY IN INTEREST

Pursuant to 37 CFR §1.192(c)(1)(as amended), and 37 CFR §41.37(c)(1)(i), the real party in interest is:

Richard G. Hyatt, Jr.,

who is the sole inventor of the subject matter defined by the pending claims.

II. RELATED APPEALS AND INTERFERENCES

37 CFR §41.37(c)(1)(ii), Appellant notes the following:

(1) Parent application Serial No. 08/720070 (Attorney's Docket No. P53821C)

Pursuant to Second Notice of Appeal (reinstatement) filed on 9 March 2009, Eighth (8th) Appeal Brief was filed on 29 April 2010 and Reply Brief and Request of Oral Hearing (reinstatement) were filed on 6 December 2010 in response to Examiner's Answer dated 6 October 2010.

(2) Co-pending Serial No. 10/440308 (Attorney's Docket No. P56895)

Pursuant to Notice of Appeal filed on 8 November 2004, and in response to the Examiner's Answer dated 2 May 2006, Reply Brief and Request for Oral Hearing were filed on 3 July 2006;

Notice of Non-Entry of Reply Brief was issued on 7 August 2006;

Petition requesting entry of Reply Brief filed on 3 July 2006 and a Substitute Reply Brief were filed on 11 October 2006 - Decision on Petition (Denied) was issued on 14 December 2006;

Renewed Petition was filed on 14 February 2007 - Decision on Petition (Denied) was issued on 23 May 2007;

Petition to Review Decision was filed on 23 July 2007 - Order Returning Undocketed Appeal to Examiner was issued on 4 February 2008 - Decision on Petition to Review Decision (Denied) was issued 30 October 2008;

Renewed Petition to Review Decision was filed 30 December 2008 - Decision on Renewed Petition to Review Decision (Denied) was issued on 19 February 2009;

Docketing Notice acknowledging filing of an Appeal Brief (12/14/05), Reply Brief (10/11/06) and Request for Oral Hearing (7/03/06) was issued on 22 June 2009;

Appeal No. 2009-011943 has been assigned; and

Currently, awaiting scheduling of an Oral Hearing.

III. STATUS OF CLAIMS

Claims 6 through 12 are pending, of which claims 6 through 8 are allowed and claims 9 through 12 are finally rejected and on appeal. Claims 1 through 5 were previously canceled.

IV. STATUS OF AMENDMENTS

An Amendment filed on 30 June 2010 subsequent to the final Office action mailed on 30 March 2010 (Paper No. 20100325) was entered upon filing of a Notice of Appeal on 30 September 2010, as indicated in the Advisory Action mailed on 15 July 2010 (Paper No. 20100712).

V. SUMMARY OF CLAIMED SUBJECT MATTER

1. Compliance With The Requirement Imposed By 37 CFR 41.37(c)(1)(v)

First, Appellant has in fact identified “for each independent claim involved in the appeal for each dependent claim argued separately, every means plus function ... the structure described in the specification as corresponding to each claimed function with reference to the specification by page and line number, and to the drawings ... by reference characters”, and additionally by reference to the specific claims defining the means plus function feature.

Appellant respectfully submits that the compliance beyond that required by 37 C.F.R. §41.37(c)(1)(v) has been demonstrated.

Pursuant to 37 CFR §41.37, and referring to Figure 1 through 22 collectively, and page 9, line 20 of the specification, Appellant’s claim 1 defines a hierarchically¹ adaptable lock 100² by using a removable cylindrical plug 101³ that is rotatably held with a lock cylinder 102⁴ of a locking mechanism. The plug has an exposed terminal face base 72⁵ perforated by a keyway 101a and a distinct electrical contact aperture 104x. The plug 101 contains either a mechanical locking mechanism, such as a re-keyable tumbler stack 82, and

¹ These hierarchies are particularly illustrated by Figures 19 through 22, and described beginning on page 23, line 4, and continuing through page 24, line 6.

² Page 10, lines 1 and 4.

³ Page 10, lines 6, 11, 13 and 19.

⁴ Beginning with page 10, line 4.

⁵ Page 10, lines 6 and 7, and page 20, line 16.

an electrical operator 105,⁶ 106, 107, 108,⁷ or simply a key retaining mechanism⁸ and an electrical operator 105, 106, 107, 108, wholly within the cylindrical exterior surface of the plug 101. The opposite base of the plug operationally supports a tailpiece 101q⁹ able to rotate a cam 103¹⁰ and position a bolt of the locking mechanism when electrical current is applied through the particular winding 106b, 107b, 108b, the corresponding shaft 106d, 107d, 108d will either axially reciprocate (*i.e.*, radially through its corresponding chamber 82) along axis A or incrementally rotate (*e.g.*, by ninety degrees within its corresponding chamber 82) around axis A and thereby alter the positional relation between blocking detent 106A, or 107A protruding from the cylinder, relative to the blocking armature 106a, 107a or 108a.

Referring additionally to Figure 18,¹¹ after insertion of a blade of a properly bitted and profiled key 200,¹² electrical power from battery 202, or alternatively electrical power and a data signal from the signal generator superimposed upon the electrical power, may be transmitted from electrical circuits of the key to the electrical operator 106b within the plug

⁶ Page 20, line 12.

⁷ Page 12, beginning with line 20.

⁸ Page 12, beginning with line 5.

⁹ Page 11, line 16.

¹⁰ Page 11, line 13.

¹¹ Page 22, line 18.

¹² Page 10, line 14, and page 23, line 5.

101. Activation of the electrical operators 105,¹³ 106, 107, 108¹⁴ within the plug 101, in conjunction with correct displacement of the mechanical locking mechanism,¹⁵ or in the embodiments constructed without a mechanical locking mechanism, simple activation of the electrical operator 105, 106, 107, 108,¹⁶ by application of electrical power to one, or more, of the corresponding coils 105b, 106b, 107b, 108b,¹⁷ enables rotation of plug 101¹⁸ within the bore of cylinder 102 as torque is manually applied to the blade of the key 200. An electronic memory ROM, or an electronic memory ROM and an electronic logic circuit μ P wholly contained within the plug,¹⁹ may be electrically interposed between the electrical operator and the electrical contacts 104x receiving power, or power and data signals, from the key 200, to control the rotation of cylinder plug 101 within cylinder shell 102, and thus govern the operation of lock 100 in dependence upon authentication and comparison of encoded data.²⁰

Integration of an electrical operator with a locking mechanism may be achieved by

¹³ Page 20, line 12, although note discussion of blocking armature 105a and solenoid coil 105b, beginning with line 7.

¹⁴ Page 12, beginning with line 20.

¹⁵ Page 11, beginning with line 5.

¹⁶ Page 22, beginning with line 18.

¹⁷ Page 22, beginning with line 18, through page 23, line 3.

¹⁸ Illustrated with different implementations, in Figures 1 through 15.

¹⁹ Page 22, beginning with line 12.

²⁰ Page 22, beginning with line 14.

incorporation of one, or more, electrical operators 105, 106, 107, 108²¹ such as, by way the simplest of examples, the mere substitution electrical operators 105, 106, 107, 108 for pin tumblers 101b, or other types of tumblers,²² within pin cylinders 80, 82²³. Alternatively, a lock may be constructed with one, or more, electrical operators functioning without any mechanical locking mechanism simultaneously resident within cylinder plug 101. In either implementation, re-boring of one, or more, of pin cylinders 80, 82 may be necessary when retrofitting an existing lock; this will not require removal or other alteration of cylinder shell 102.²⁴

Claim 9

Pursuant to 37 CFR §41.37, and referring to Figure 1 through 22 collectively, and page 9, line 20 of the specification, Appellant's claim 9 discloses a process for retrofitting a hierarchically²⁵ adaptable lock 100²⁶ by using a removable cylindrical plug 101²⁷ that is

²¹ Page 22, beginning with line 18.

²² With a concomitant re-bitting of the corresponding key to omit from the blade of the key any (or each) "tooth corresponding to the cylinder occupied by solenoid 105b". See, page 20, line 21 and page 21, lines 1 and 2.

²³ Page 21, lines 8 through 11 and page 22, beginning with line 18., as illustrated by Figures 1 and 8A.

²⁴ Page 21, lines 8-11.

²⁵ These hierarchies are particularly illustrated by Figures 19 through 22, and described beginning on page 23, line 4, and continuing through page 24, line 6.

²⁶ Page 10, lines 1 and 4.

²⁷ Page 10, lines 6, 11, 13 and 19.

rotatably held with a lock cylinder 102²⁸ of a locking mechanism. The plug has an exposed terminal face base 72²⁹ perforated by a keyway 101a and a distinct electrical contact aperture 104x. The plug 101 contains either a mechanical locking mechanism, such as a re-keyable tumbler stack 82, and an electrical operator 105,³⁰ 106, 107, 108,³¹ or simply a key retaining mechanism³² and an electrical operator 105, 106, 107, 108, wholly within the cylindrical exterior surface of the plug 101. The opposite base of the plug operationally supports a tailpiece 101q³³ able to rotate a cam 103³⁴ and position a bolt of the locking mechanism when electrical current is applied through the particular winding 106b, 107b, 108b, the corresponding shaft 106d, 107d, 108d will either axially reciprocate (*i.e.*, radially through its corresponding chamber 82) along axis A or incrementally rotate (*e.g.*, by ninety degrees within its corresponding chamber 82) around axis A and thereby alter the positional relation between blocking detent 106A, or 107A protruding from the cylinder, relative to the blocking armature 106a, 107a or 108a.

Referring additionally to Figure 18,³⁵ after insertion of a blade of a properly bitted and

²⁸ Beginning with page 10, line 4.

²⁹ Page 10, lines 6 and 7, and page 20, line 16.

³⁰ Page 20, line 12.

³¹ Page 12, beginning with line 20.

³² Page 12, beginning with line 5.

³³ Page 11, line 16.

³⁴ Page 11, line 13.

³⁵ Page 22, line 18.

profiled key 200,³⁶ electrical power from battery 202, or alternatively electrical power and a data signal from the signal generator superimposed upon the electrical power, may be transmitted from electrical circuits of the key to the electrical operator 106b within the plug 101. Activation of the electrical operators 105,³⁷ 106, 107, 108³⁸ within the plug 101, in conjunction with correct displacement of the mechanical locking mechanism,³⁹ or in the embodiments constructed without a mechanical locking mechanism, simple activation of the electrical operator 105, 106, 107, 108,⁴⁰ by application of electrical power to one, or more, of the corresponding coils 105b, 106b, 107b, 108b,⁴¹ enables rotation of plug 101⁴² within the bore of cylinder 102 as torque is manually applied to the blade of the key 200. An electronic memory ROM, or an electronic memory ROM and an electronic logic circuit μ P wholly contained within the plug,⁴³ may be electrically interposed between the electrical operator and the electrical contacts 104x receiving power, or power and data signals, from the key 200, to control the rotation of cylinder plug 101 within cylinder shell 102, and thus govern the operation of lock 100 in dependence upon authentication and comparison of

³⁶ Page 10, line 14, and page 23, line 5.

³⁷ Page 20, line 12, although note discussion of blocking armature 105a and solenoid coil 105b, beginning with line 7.

³⁸ Page 12, beginning with line 20.

³⁹ Page 11, beginning with line 5.

⁴⁰ Page 22, beginning with line 18.

⁴¹ Page 22, beginning with line 18, through page 23, line 3.

⁴² Illustrated with different implementations, in Figures 1 through 15.

⁴³ Page 22, beginning with line 12.

encoded data.⁴⁴

Integration of an electrical operator with a locking mechanism may be achieved by incorporation of one, or more, electrical operators 105, 106, 107, 108⁴⁵ such as, by way the simplest of examples, the mere substitution electrical operators 105, 106, 107, 108 for pin tumblers 101b, or other types of tumblers,⁴⁶ within pin cylinders 80, 82⁴⁷. Alternatively, a lock may be constructed with one, or more, electrical operators functioning without any mechanical locking mechanism simultaneously resident within cylinder plug 101. Retrofitting an existing lock will not require removal or other alteration of cylinder shell 102.⁴⁸

Integration of an electrical operator with a locking mechanism may be achieved by incorporation of one, or more, electrical operators 105, 106, 107, 108⁴⁹ such as, by way the simplest of examples, the mere substitution electrical operators 105, 106, 107, 108 for pin

⁴⁴ Page 22, beginning with line 14.

⁴⁵ Page 22, beginning with line 18.

⁴⁶ With a concomitant re-bitting of the corresponding key to omit from the blade of the key any (or each) "tooth corresponding to the cylinder occupied by solenoid 105b". See, page 20, line 21 and page 21, lines 1 and 2.

⁴⁷ Page 21, lines 8 through 11 and page 22, beginning with line 18., as illustrated by Figures 1 and 8A.

⁴⁸ Page 21, lines 8-11.

⁴⁹ Page 22, beginning with line 18.

tumblers 101b, or other types of tumblers,⁵⁰ within pin cylinders 80, 82⁵¹. Alternatively, a lock may be constructed with one, or more, electrical operators functioning without any mechanical locking mechanism simultaneously resident within cylinder plug 101. In either implementation, re-boring of one, or more, of pin cylinders 80, 82 may be necessary when

The appealed claims 9 through 12 do not use either “means plus function” or “step plus function” definitions under the sixth paragraph of 35 U.S.C. §112.⁵²

Claim 10

Pursuant to 37 CFR §41.37, and referring to Figure 1 through 22 collectively, and page 9, line 20 of the specification, Appellant’s claim 10 discloses a hierarchically⁵³ adaptable lock 100⁵⁴ by using a removable cylindrical plug 101⁵⁵ that is rotatably held with a lock cylinder 102⁵⁶ of a locking mechanism. The plug has an exposed terminal face base 72⁵⁷ perforated by a keyway 101a and a distinct electrical contact aperture 104x. The plug 101 contains either a mechanical locking mechanism, such as a re-keyable tumbler stack 82,

⁵⁰ With a concomitant re-bitting of the corresponding key to omit from the blade of the key any (or each) “tooth corresponding to the cylinder occupied by solenoid 105b”. See, page 20, line 21 and page 21, lines 1 and 2.

⁵¹ Page 21, lines 8 through 11 and page 22, beginning with line 18., as illustrated by Figures 1 and 8A.

⁵² 37 CFR §41.37(c)(1)(v).

⁵³ These hierarchies are particularly illustrated by Figures 19 through 22, and described beginning on page 23, line 4, and continuing through page 24, line 6.

⁵⁴ Page 10, lines 1 and 4.

⁵⁵ Page 10, lines 6, 11, 13 and 19.

⁵⁶ Beginning with page 10, line 4.

⁵⁷ Page 10, lines 6 and 7, and page 20, line 16.

and an electrical operator 105,⁵⁸ 106, 107, 108,⁵⁹ or simply a key retaining mechanism⁶⁰ and an electrical operator 105, 106, 107, 108, wholly within the cylindrical exterior surface of the plug 101. The opposite base of the plug operationally supports a tailpiece 101q⁶¹ able to rotate a cam 103⁶² and position a bolt of the locking mechanism when electrical current is applied through the particular winding 106b, 107b, 108b, the corresponding shaft 106d, 107d, 108d will either axially reciprocate (*i.e.*, radially through its corresponding chamber 82) along axis A or incrementally rotate (*e.g.*, by ninety degrees within its corresponding chamber 82) around axis A and thereby alter the positional relation between blocking detent 106A, or 107A protruding from the cylinder, relative to the blocking armature 106a, 107a or 108a.

Referring additionally to Figure 18,⁶³ after insertion of a blade of a properly bitted and profiled key 200,⁶⁴ electrical power from battery 202, or alternatively electrical power and a data signal from the signal generator superimposed upon the electrical power, may be transmitted from electrical circuits of the key to the electrical operator 106b within the plug

⁵⁸ Page 20, line 12.

⁵⁹ Page 12, beginning with line 20.

⁶⁰ Page 12, beginning with line 5.

⁶¹ Page 11, line 16.

⁶² Page 11, line 13.

⁶³ Page 22, line 18.

⁶⁴ Page 10, line 14, and page 23, line 5.

101. Activation of the electrical operators 105,⁶⁵ 106, 107, 108⁶⁶ within the plug 101, in conjunction with correct displacement of the mechanical locking mechanism,⁶⁷ or in the embodiments constructed without a mechanical locking mechanism, simple activation of the electrical operator 105, 106, 107, 108,⁶⁸ by application of electrical power to one, or more, of the corresponding coils 105b, 106b, 107b, 108b,⁶⁹ enables rotation of plug 101⁷⁰ within the bore of cylinder 102 as torque is manually applied to the blade of the key 200. An electronic memory ROM, or an electronic memory ROM and an electronic logic circuit μ P wholly contained within the plug,⁷¹ may be electrically interposed between the electrical operator and the electrical contacts 104x receiving power, or power and data signals, from the key 200, to control the rotation of cylinder plug 101 within cylinder shell 102, and thus govern the operation of lock 100 in dependence upon authentication and comparison of encoded data.⁷²

Integration of an electrical operator with a locking mechanism may be achieved by

⁶⁵ Page 20, line 12, although note discussion of blocking armature 105a and solenoid coil 105b, beginning with line 7.

⁶⁶ Page 12, beginning with line 20.

⁶⁷ Page 11, beginning with line 5.

⁶⁸ Page 22, beginning with line 18.

⁶⁹ Page 22, beginning with line 18, through page 23, line 3.

⁷⁰ Illustrated with different implementations, in Figures 1 through 15.

⁷¹ Page 22, beginning with line 12.

⁷² Page 22, beginning with line 14.

incorporation of one, or more, electrical operators 105, 106, 107, 108⁷³ such as, by way the simplest of examples, the mere substitution electrical operators 105, 106, 107, 108 for pin tumblers 101b, or other types of tumblers,⁷⁴ within pin cylinders 80, 82⁷⁵. Alternatively, a lock may be constructed with one, or more, electrical operators functioning without any mechanical locking mechanism simultaneously resident within cylinder plug 101. In either implementation, re-boring of one, or more, of pin cylinders 80, 82 may be necessary when retrofitting an existing lock; this will not require removal or other alteration of cylinder shell 102.⁷⁶

Claim 11

Pursuant to 37 CFR §41.37, and referring to Figure 1 through 22 collectively, and page 9, line 20 of the specification, Appellant's claim 11 discloses a hierarchically⁷⁷ adaptable lock 100⁷⁸ by using a removable cylindrical plug 101⁷⁹ that is rotatably held with

⁷³ Page 22, beginning with line 18.

⁷⁴ With a concomitant re-bitting of the corresponding key to omit from the blade of the key any (or each) "tooth corresponding to the cylinder occupied by solenoid 105b". See, page 20, line 21 and page 21, lines 1 and 2.

⁷⁵ Page 21, lines 8 through 11 and page 22, beginning with line 18., as illustrated by Figures 1 and 8A.

⁷⁶ Page 21, lines 8-11.

⁷⁷ These hierarchies are particularly illustrated by Figures 19 through 22, and described beginning on page 23, line 4, and continuing through page 24, line 6.

⁷⁸ Page 10, lines 1 and 4.

⁷⁹ Page 10, lines 6, 11, 13 and 19.

a lock cylinder 102⁸⁰ of a locking mechanism. The plug has an exposed terminal face base 72⁸¹ perforated by a keyway 101a and a distinct electrical contact aperture 104x. The plug 101 contains either a mechanical locking mechanism, such as a re-keyable tumbler stack 82, and an electrical operator 105,⁸² 106, 107, 108,⁸³ or simply a key retaining mechanism⁸⁴ and an electrical operator 105, 106, 107, 108, wholly within the cylindrical exterior surface of the plug 101. The opposite base of the plug operationally supports a tailpiece 101q⁸⁵ able to rotate a cam 103⁸⁶ and position a bolt of the locking mechanism when electrical current is applied through the particular winding 106b, 107b, 108b, the corresponding shaft 106d, 107d, 108d will either axially reciprocate (*i.e.*, radially through its corresponding chamber 82) along axis A or incrementally rotate (*e.g.*, by ninety degrees within its corresponding chamber 82) around axis A and thereby alter the positional relation between blocking detent 106A, or 107A protruding from the cylinder, relative to the blocking armature 106a, 107a or 108a.

Referring additionally to Figure 18,⁸⁷ after insertion of a blade of a properly bitted and

⁸⁰ Beginning with page 10, line 4.

⁸¹ Page 10, lines 6 and 7, and page 20, line 16.

⁸² Page 20, line 12.

⁸³ Page 12, beginning with line 20.

⁸⁴ Page 12, beginning with line 5.

⁸⁵ Page 11, line 16.

⁸⁶ Page 11, line 13.

⁸⁷ Page 22, line 18.

profiled key 200,⁸⁸ electrical power from battery 202, or alternatively electrical power and a data signal from the signal generator superimposed upon the electrical power, may be transmitted from electrical circuits of the key to the electrical operator 106b within the plug 101. Activation of the electrical operators 105,⁸⁹ 106, 107, 108⁹⁰ within the plug 101, in conjunction with correct displacement of the mechanical locking mechanism,⁹¹ or in the embodiments constructed without a mechanical locking mechanism, simple activation of the electrical operator 105, 106, 107, 108,⁹² by application of electrical power to one, or more, of the corresponding coils 105b, 106b, 107b, 108b,⁹³ enables rotation of plug 101⁹⁴ within the bore of cylinder 102 as torque is manually applied to the blade of the key 200. An electronic memory ROM, or an electronic memory ROM and an electronic logic circuit μ P wholly contained within the plug,⁹⁵ may be electrically interposed between the electrical operator and the electrical contacts 104x receiving power, or power and data signals, from the key 200, to control the rotation of cylinder plug 101 within cylinder shell 102, and thus govern the operation of lock 100 in dependence upon authentication and comparison of

⁸⁸ Page 10, line 14, and page 23, line 5.

⁸⁹ Page 20, line 12, although note discussion of blocking armature 105a and solenoid coil 105b, beginning with line 7.

⁹⁰ Page 12, beginning with line 20.

⁹¹ Page 11, beginning with line 5.

⁹² Page 22, beginning with line 18.

⁹³ Page 22, beginning with line 18, through page 23, line 3.

⁹⁴ Illustrated with different implementations, in Figures 1 through 15.

⁹⁵ Page 22, beginning with line 12.

encoded data.⁹⁶

Integration of an electrical operator with a locking mechanism may be achieved by incorporation of one, or more, electrical operators 105, 106, 107, 108⁹⁷ such as, by way the simplest of examples, the mere substitution electrical operators 105, 106, 107, 108 for pin tumblers 101b, or other types of tumblers,⁹⁸ within pin cylinders 80, 82⁹⁹. Alternatively, a lock may be constructed with one, or more, electrical operators functioning without any mechanical locking mechanism simultaneously resident within cylinder plug 101. In either implementation, re-boring of one, or more, of pin cylinders 80, 82 may be necessary when retrofitting an existing lock; this will not require removal or other alteration of cylinder shell 102.¹⁰⁰ Appealed claim 11 does not use either “means plus function” or “step plus function” definitions under the sixth paragraph of 35 U.S.C. §112.¹⁰¹

Claim 12

Pursuant to 37 CFR §41.37, and referring to Figure 1 through 22 collectively, and

⁹⁶ Page 22, beginning with line 14.

⁹⁷ Page 22, beginning with line 18.

⁹⁸ With a concomitant re-bitting of the corresponding key to omit from the blade of the key any (or each) “tooth corresponding to the cylinder occupied by solenoid 105b”. See, page 20, line 21 and page 21, lines 1 and 2.

⁹⁹ Page 21, lines 8 through 11 and page 22, beginning with line 18., as illustrated by Figures 1 and 8A.

¹⁰⁰ Page 21, lines 8-11.

¹⁰¹ 37 CFR §41.37(c)(1)(v).

page 9, line 20 of the specification, Appellant's claim 12 discloses a hierarchically¹⁰² adaptable lock 100¹⁰³ by using a removable cylindrical plug 101¹⁰⁴ that is rotatably held with a lock cylinder 102¹⁰⁵ of a locking mechanism. The plug has an exposed terminal face base 72¹⁰⁶ perforated by a keyway 101a and a distinct electrical contact aperture 104x. The plug 101 contains either a mechanical locking mechanism, such as a re-keyable tumbler stack 82, and an electrical operator 105,¹⁰⁷ 106, 107, 108,¹⁰⁸ or simply a key retaining mechanism¹⁰⁹ and an electrical operator 105, 106, 107, 108, wholly within the cylindrical exterior surface of the plug 101. The opposite base of the plug operationally supports a tailpiece 101q¹¹⁰ able to rotate a cam 103¹¹¹ and position a bolt of the locking mechanism when electrical current is applied through the particular winding 106b, 107b, 108b, the corresponding shaft 106d, 107d, 108d will either axially reciprocate (*i.e.*, radially through its corresponding chamber 82) along axis A or incrementally rotate (*e.g.*, by ninety degrees within its corresponding

¹⁰² These hierarchies are particularly illustrated by Figures 19 through 22, and described beginning on page 23, line 4, and continuing through page 24, line 6.

¹⁰³ Page 10, lines 1 and 4.

¹⁰⁴ Page 10, lines 6, 11, 13 and 19.

¹⁰⁵ Beginning with page 10, line 4.

¹⁰⁶ Page 10, lines 6 and 7, and page 20, line 16.

¹⁰⁷ Page 20, line 12.

¹⁰⁸ Page 12, beginning with line 20.

¹⁰⁹ Page 12, beginning with line 5.

¹¹⁰ Page 11, line 16.

¹¹¹ Page 11, line 13.

chamber 82) around axis A and thereby alter the positional relation between blocking detent 106A, or 107A protruding from the cylinder, relative to the blocking armature 106a, 107a or 108a.

Referring additionally to Figure 18,¹¹² after insertion of a blade of a properly bitted and profiled key 200,¹¹³ electrical power from battery 202, or alternatively electrical power and a data signal from the signal generator superimposed upon the electrical power, may be transmitted from electrical circuits of the key to the electrical operator 106b within the plug 101. Activation of the electrical operators 105,¹¹⁴ 106, 107, 108¹¹⁵ within the plug 101, in conjunction with correct displacement of the mechanical locking mechanism,¹¹⁶ or in the embodiments constructed without a mechanical locking mechanism, simple activation of the electrical operator 105, 106, 107, 108,¹¹⁷ by application of electrical power to one, or more, of the corresponding coils 105b, 106b, 107b, 108b,¹¹⁸ enables rotation of plug 101¹¹⁹ within the bore of cylinder 102 as torque is manually applied to the blade of the key 200. An electronic memory ROM, or an electronic memory ROM and an electronic logic circuit μ P

¹¹² Page 22, line 18.

¹¹³ Page 10, line 14, and page 23, line 5.

¹¹⁴ Page 20, line 12, although note discussion of blocking armature 105a and solenoid coil 105b, beginning with line 7.

¹¹⁵ Page 12, beginning with line 20.

¹¹⁶ Page 11, beginning with line 5.

¹¹⁷ Page 22, beginning with line 18.

¹¹⁸ Page 22, beginning with line 18, through page 23, line 3.

¹¹⁹ Illustrated with different implementations, in Figures 1 through 15.

wholly contained within the plug,¹²⁰ may be electrically interposed between the electrical operator and the electrical contacts 104x receiving power, or power and data signals, from the key 200, to control the rotation of cylinder plug 101' within cylinder shell 102, and thus govern the operation of lock 100 in dependence upon authentication and comparison of encoded data.¹²¹

Integration of an electrical operator with a locking mechanism may be achieved by incorporation of one, or more, electrical operators 105, 106, 107, 108¹²² such as, by way the simplest of examples, the mere substitution electrical operators 105, 106, 107, 108 for pin tumblers 101b, or other types of tumblers,¹²³ within pin cylinders 80, 82¹²⁴. Alternatively, a lock may be constructed with one, or more, electrical operators functioning without any mechanical locking mechanism simultaneously resident within cylinder plug 101. In either implementation, re-boring of one, or more, of pin cylinders 80, 82 may be necessary when retrofitting an existing lock; this will not require removal or other alteration of cylinder shell 102.¹²⁵

Appealed claim 14 does not use either "means plus function" or "step plus function"

¹²⁰ Page 22, beginning with line 12.

¹²¹ Page 22, beginning with line 14.

¹²² Page 22, beginning with line 18.

¹²³ With a concomitant re-bitting of the corresponding key to omit from the blade of the key any (or each) "tooth corresponding to the cylinder occupied by solenoid 105b". See, page 20, line 21 and page 21, lines 1 and 2.

¹²⁴ Page 21, lines 8 through 11 and page 22, beginning with line 18., as illustrated by Figures 1 and 8A.

¹²⁵ Page 21, lines 8-11.

definitions under the sixth paragraph of 35 U.S.C. §112.¹²⁶

¹²⁶ 37 CFR §41.37(c)(1)(v).

VI. GROUNDS OF REJECTION TO BE REVIEWED ON APPEAL

Double Patenting

Claims 11 and 12 are provisionally rejected on the ground of nonstatutory obviousness-type double patenting as being unpatentable over claims 90 and 120 of copending Application No. 08/720,070.

The Examiner states that the conflicting claims are not identical, but they are not patentably distinct from each other because they recite the same structure merely using different phraseology in certain instances.

Rejection of Claims 10, 11 and 12 under 35 U.S.C. §112

A. Claims 11 and 12 are rejected under the first paragraph of 35 U.S.C. §112 for lack of enablement.

The Examiner contends that the specification fails to provide support for the “at least one additional electromechanical locking member” set forth in claims 11 and 12.

In support of the rejection, the Examiner states that “the solenoid coils 109, are not disclosed ‘locking members’ as argued by Appellant”, and that “the specification discloses the ‘plurality’ of locking members 106a, 107a, 108a being used alternatively and not as a plurality within the same plug”, referring to page 12, lines 11-14 of the specification as clearly reciting the use of locking member 106a or 107a or 108a.

B. Claim 10 is rejected under the second paragraph of 35 U.S.C. §112 for lack of antecedent basis.

The Examiner states that in claim 10, line 9, there is no antecedent basis for “the side

bar". Accordingly, claim 10 is being amended to overcome this rejection.

Rejection of Claims 9 through 12 under 35 U.S.C. §103

Claims 9 through 12 are collectively rejected under 35 U.S.C. §103(a) as being unpatentable over Gokcebay, U.S. Patent No. 5,552,777 in view of Thordmark *et al.*, U.S. Patent No. 5,542,274 and Naveda, U.S. Patent No. 4,416,127.

VII. ARGUMENT

Double Patenting

Claims 11 and 12 are provisionally rejected on the ground of nonstatutory obviousness-type double patenting as being unpatentable over claims 90 and 120 of copending Application No. 08/720,070. This rejection is improper, and unlawful, for the following reasons.

First, the Examiner states that the conflicting claims are not identical, but they are not patentably distinct from each other because they recite the same structure merely using different phraseology in certain instances. §806.01 of the *Manual of Patent Examining Procedure*, 8th Edition, Rev. 7 (August 2008) requires that,

“In passing upon questions of double patenting and restriction, it is the claimed subject matter that is considered and such claimed subject matter *must be compared* in order to determine the question of distinctness or independence.”

Paper No. 20100325 however, provides no comparison of the four claims at issue. Appellant submits therefore, that Paper No. 20100326 fails to meet the requirement of 37 CFR §1.104(a) for thoroughness and §1.104 (b) for completeness. Designation of Paper No. 20100325 as “final” is thus premature.

Second, the comparison required by §806.01 of the *MPEP*, is shown in Tables 1 and 2 below.

Table 1 establishes on the evidence present in this administrative record, that pending claim 11 and independent process claim 90 of Appellant’s copending parent application

Serial No. 08/720,070, and are distinctive, and independent from one another. The Examiner's attention is invited to observe that rejected dependent process claim 11 defines, *inter alia* aspects, Appellant's:

- (i) "an electromechanical locking member substantially entirely contained within the barrel member," and
- (ii) "providing at least one additional electromechanical locking member disposed in the barrel, the additional electromechanical locking member being also positionable to permit the side bar to engage the locking member in a non-barrel blocking position which permits the barrel to rotate with respect to the shell."

Neither of these features are present within process claim 90 of Appellant's parent application Serial No. 08/720,070. Consequently, this rejection of dependent process claim 11 is not supported by the administrative record, and is unsustainable.

TABLE 1

9. A process of retrofitting a mechanical cylinder lock to form an electromechanical cylinder lock, the process comprising steps of:

providing a mechanical cylinder lock including an outer shell with a bore having a recess accommodating movement by a side bar, and a first rotatable barrel located in the bore;

removing the first barrel from the shell;

providing an electronically powered rotatable barrel including:

a side bar preventing and permitting rotation of the barrel within the bore in the shell;

an electromechanical locking member substantially entirely contained within the barrel member, the electromechanical locking member being positionable to permit the side bar to engage the locking member in a non-barrel blocking position which permits the barrel to rotate with respect to the shell, and the electromechanical locking member also being positionable to place the sidebar in a barrel blocking position which blocks rotation of the barrel with respect to the shell;

an electronically powered drive mechanism cooperating with the electromechanical locking member to selectively move the locking member from the barrel blocking position to the non-barrel blocking position in which the side bar engages the locking member to rotate the barrel and operate the lock; and

a controller carried by the barrel energizing the electronically powered drive mechanism in response to an authorized attempt to open the lock; and

inserting the electronically powered rotatable barrel into the bore in the shell to form an electromechanical cylinder lock

11. The process of claim 9, the process comprising steps of providing at least one additional electromechanical locking member disposed in the barrel, the additional electromechanical locking member being also positionable to permit the side bar to engage the locking member in a non-barrel blocking position which permits the barrel to rotate with respect to the shell.

TABLE 2

10. A rotatable lock barrel for insertion into a lock cylinder having a bore formed therein, the barrel comprising:

an elongated, generally cylindrically shaped barrel member having an exterior configured for receipt in a bore of a lock cylinder and an interior containing an electromechanical locking member, the barrel member having a recess formed therein;

wherein the locking member is disposed in the recess of the barrel member and is substantially entirely contained within the barrel member, the locking member including a groove;

the recess in said barrel member permitting a side bar to move into and out of engagement with the groove of the locking member for selectively permitting and blocking rotation of the barrel member with respect to a lock cylinder when positioned therein;

an electronically powered drive mechanism located within the barrel member moving the electromechanical locking member to a position in which the groove of the locking member is aligned to receive the side bar.

12. The rotatable lock barrel of claim 10, comprising at least one additional electromechanical locking member substantially entirely contained within the barrel member, the additional locking member including a groove and being movable to a position in which the grooves of the locking members are aligned to permit the side bar to engage the locking member in a non-barrel blocking position which permits the barrel to rotate with respect to the shell.

120. A rotatable lock barrel for insertion into a lock cylinder having a bore formed therein, the barrel comprising:

an elongated, generally cylindrically shaped barrel member having an exterior configured for receipt in a bore of a lock cylinder and an interior containing a plurality of electromechanical locking members, the barrel member having a recess formed therein;

wherein the locking members are disposed in the recess of the barrel member and are substantially

Table 2 establishes on the evidence present in this administrative record, that pending dependent apparatus claim 12 and claim 120 of Appellant's copending parent application Serial No. 08/720,070, are distinctive, and independent from one another. The Examiner's attention is invited to observe that rejected dependent process claim 12 defines, *inter alia* aspects, Appellant's structure:

- (i) "in which the grooves of the locking members are aligned to permit the side bar to engage the locking member in a non-barrel blocking position," and
- (ii) "in which the grooves of the locking members are aligned to permit the side bar to engage the locking member in a non-barrel blocking position which permits the barrel to rotate with respect to the shell.."

Neither of these features are present in independent claim 120 of Appellant's parent application Serial No. 08/720,070. Consequently, this rejection of dependent process claim 11 is not supported by the administrative record, and is unsustainable.

Third, §804.01 of the *MPEP* states that,

"The third sentence of 35 U.S.C. §121 *prohibits* the use of a patent issuing on an application with respect to which a requirement for restriction has been made, or on an application

filed as a result of such a requirement, as a reference against any
divisional application ...”

The above-captioned application is a divisional application filed as a result of a multiple species requirement for restriction was imposed under 35 U.S.C. §121 and 37 CFR §1.146.

Why then, has this prohibition of §804.01 of *MPEP* and 35 U.S.C. §121 not been observed?

This rejection is a violation of the Office’s instructions to the examining corps set forth in §804.01 of the *MPEP* , and is unlawful under 35 U.S.C. §121. This rejection may not therefore, be sustained on the administrative record of this prosecution history. Its withdrawal is respectfully urged.

Fourth, and as was previously explained to the Examiner, Paper No. 20100325 is utterly devoid of any indication that the Examining staff has sought to comply with current U.S. practice; the Examiner must:

- (A) determine the scope and content of a patent claim relative to a claim in the application at issue;
- (B) determine the differences between the scope and content of the patent claim as determined in (A) and the claim in the application at issue;
- (C) determine the level of ordinary skill in the pertinent art; and
- (D) evaluate any objective indicia of non-obviousness.¹²⁷ Here, the Examiner has made a summary conclusion that claims 11 and 12 are “claiming the same subject

¹²⁷ MPEP §804(B), Revision 3, August 2005.

matter as that of claims 90 and 120 of copending Application No. 08/720,070.” There is no evidence of record to support the Examiner’s conclusion of double patenting over Appellant’s copending Application No. 08/720,070, where claims 90 and 120 were copied over a decade ago, and remain pending before this Examiner, without substantive, or competent action.

Fifth, this rejection continues to deviate from U.S. procedure as outlined in the *Manual*. As is clearly explained in the *Manual*,

“words in patent claims are given their ordinary meaning in the usage of the field of the invention, unless the text of the patent makes clear that the word was used with a special meanings.”

Renishaw PLC v. Marposs Societa’ per Azioni, 158 F.3d 1243, 1250, 48 USPQ2d 1117, 1122 (Fed. Cir. 1998). MPEP §804

Moreover, there is no evidence cited in Paper No. 20100325 which supports even the slightest inference that “the conflicting claims ... recite like elements using different terminology and/or phraseology” as is argued by the Examiner in support of this rejection. In point of fact, Paper No. 2010325 does not identify any “like elements” in any claim. In short, not only is there no evidence of record that these claims define “like elements”, this rejection simply seeks to may a summary conclusion of obviousness by equating the “structure and operable functional features” of different devices defined in the art. Unexplained in the Examiner’s conclusion is how an art recognized components might be employed to perform other functions of other art recognized components. Written

clarification is respectfully requested in subsequent Office correspondence.

In view of the foregoing failure of the Examining staff to comply with the degree of completeness mandated by 37 C.F.R. §1.104(a)(b) and (c), Paper No. 20100325 is incomplete. Clarification in subsequent Office correspondence demonstrating substantive progress in the examination of Appellant's 08/720.070 pending application which is required in order to sustain this rejection; the fact that the claims 90 and 120 remain pending for over a decade is not a lawful basis for an assertion of double patenting under 35 U.S.C. §101.

It should be noted therefore, that the Examiner has failed under 35 U.S.C. §§101 and 121 to satisfy any of the four requirements for double patenting analysis mandated by §804 of the *Manual of Patent Examining Procedure*, (8th Edition, Rev. 3) May 2007. This indicates a lack of both double patenting and of obviousness; consequently, there is no basis for asserting double patenting.

Moreover, this rejection is a "provisional rejection", and may not be made final absent issue of at least one of Appellant's above-captioned Application No. 10/630,759 or co-pending application Serial No. 08/720,070. The Board is not believed therefore, to have jurisdiction over this rejection.

Sixth, under 35 U.S.C. §121 and 37 CFR §1.146, when all of those claims encompassing non-elected subject matter have either been cancelled or amended to encompass the elected subject matter, an assertion by the Examining staff that the requirement for election has been withdrawn is meaningless, both in practical terms (because those claims originally drawn to the non-elected subject matter are not rejoined and

examined due to their cancellation or amendment) and under 35 U.S.C. §121 and 37 CFR §1.146. Absent Congressional action to modify 35 U.S.C. §121, neither the Director nor any member of the Examining staff has the authority to belatedly overrule the action taken by the Office in Paper No. 8, in imposing that requirement for an election of species.

Where, as here, one, or more, or a sequence of divisional patent applications filed as a result of a requirement for restriction imposed by the Office, or as in *Boehringer Ingelheim Int'l v. Barr Laboratories, Inc.*, ___ F.3d ___ (Fed. Cir. 2010), multiple divisional applications “encompassing various combinations of claims comprising the ***different inventions*** as being distinct in the restriction requirement assessed against the ... [parent] application,” the Appellant has satisfied the “as a result of” provision of 35 U.S.C. §121. Moreover, *Boehringer* observed that the safe harbor provided by 35 U.S.C. §121 applies “when the PTO issues a restriction requirement that leads to more than two separate applications” because 35 U.S.C. §121 “refers broadly to *a divisional application*, and does not state that the divisional application must be a direct divisional of the original application, but extends to applications “sharing a common lineage ... or to continuation applications of divisional applications.”

None of these issues have been considered by the final Office action.

This rejection is therefore, not sustainable on the evidence of record before the Board.

Withdrawal of this rejection is therefore respectfully requested. Such action is urged.

Rejection of Claims 10, 11 and 12 under 35 U.S.C. §112

A. Claims 11 and 12 are rejected under the first paragraph of 35 U.S.C. §112 for lack of enablement.

Specifically, the Examiner contends that the specification fails to provide support for the “at least one additional electromechanical locking member” set forth in claims 11 and 12.

In support of this rejection, the Examiner states that “the solenoid coils 109, are not disclosed ‘locking members’ as argued by Appellant”, and that “the specification discloses the ‘plurality’ of locking members 106a, 107a, 108a being used alternatively and not as a plurality within the same plug”, referring to page 12, lines 11-14 of the specification as clearly reciting the use of locking member 106a or 107a or 108a.

* * *

Rejection under 35 U.S.C. § 112

Claims 11 and 12 are rejected under the first paragraph of 35 U.S.C. §112 for lack of enablement. Specifically, the Examiner states that the specification fails to provide support for the “at least one electromechanical locking member” and “plurality of electromechanical locking members” set forth in claims 11 and 12, respectively.

More specifically, the Examiner states that,

“[t]his rejection stands, since, firstly, the solenoid coils 109, are not disclosed ‘locking members’ as argued by Appellant. Secondly, the specification discloses that the ‘plurality’ of

locking members 106a, 107a, 108a are used alternatively and not as a plurality within the same plug. See the specification on page 12, lines 11 -14 which clearly recites the use of locking member 106a or 107a or 108a.”

This conclusion of law is nearly identical to the conclusion of law made by the Examining staff in Appellant’s Serial No. 08/720,070, where claims 90 and 120 were rejected under the first paragraph of 35 U.S.C. §112, with an averment that Appellant’s specification failed to satisfy the enablement requirement of the first paragraph of 35 U.S.C. §112 because these claims contain “subject matter which was not described in the specification in such a way as to enable one skilled in the art to which it pertains, or with which it is most nearly connected, to make and /or use the invention.” The rejection is improper for the following reasons. Specifically, the Examiner states that the specification fails to provide support for the “at least one electromechanical locking member” and “plurality of electromechanical locking members” set forth in claims 90 and 120, respectively.

There, the Examiner argues that,

“firstly, the solenoid coils 109, argued on page 69 of the amendment filed 2/24/03, are not disclosed ‘locking members’.”

The Examiner has confused the disclosure in the specification. With reference to Figure 3, by way of example, the “solenoid coils” are identified by reference numbers such as “106d” or “106D”, or in Figure 5A, “108b”, and in Figure 5, as “108b”. The entire assembly however, is readily described as “a plurality of electromechanical locking members.” Moreover, Appellant clearly illustrate three discrete versions of these plurality of

electromechanical locking members in Figure 1, and nowhere negates use of more than a single one of these plurality of electromechanical locking members.

The Examiner's attention is invited to consider the question of enablement discussed in *Arnold C. Bilstad, the Gorge Wakalopulos*, 386 F.3 1116 (Fed.Cir. 7 October 2004) where the Court noted "[T]hat a claim may be broader than the specific embodiment disclosed in a specification is in itself of no moment." Here, as in Bilstad, Appellant discloses a plurality of single assemblies that, unlike references of record such as Gokcebay '777 contains "a plurality of electromechanical locking members" as well as "at least one electromechanical locking member" as set forth in claims 90 and 120, respectively.

The Examiner further argues that,

"The specification discloses that the 'plurality' of locking members 106a, 107a, 108a are used alternatively and not as a plurality within the same plug." See the specification on page 12, lines 11 -13 which clearly recites the use of locking member 106a or 107a or 108a."

Appellant notes that the discussion on page 12, lines 11-13 is one small portion of the entirety of Appellant's specification, and that portion describes the interchangeability of these assemblies in different embodiments. Nothing in Appellant's page 12 negates the use of a plurality of any one of these embodiments or the use of two, or more, different ones of these embodiments.

The Examiner is referred to *Lampi Corp. v. American Power Products, Inc.*, 228 F3d 1365, 1377-78 (Fed. Cir. 2000) which affirmed a District Court's finding that disclosure of

only identical half-shells were sufficient with description support for a claim in compassing both identical and non-identical half-shells. As a general rule, a disclosure of species provides sufficient written description support for a later filed claim directed to a genus.

Here, the Examiner seeks to ignore this general rule and instead, substitute a rule that disclosure of “one” invokes a “one and only one” limitation. This substitution was refuted by the U.S. Court of Appeals for the Federal Circuit, which held, in the interpretation of claims, “the use of the singular form “a” in conjunction with “comprising” and without narrowing language typically encompasses **both** singular and plural embodiments.”¹²⁸

Consequently, the basis for this rejection is unattainable, and may not be sustained. The Examiner is respectfully urged therefore, to withdraw this rejection in view of the overwhelming adequacy of Appellant’s disclosure of a multiplicity of embodiments which may be used either singularly, in various combinations of different species or in a plurality of like or different species. Such action is respectfully urged.

A. Appellant’s Originally Filed Specification Provides Enablement For The Subject Matter Defined By Claims 11 and 12

In support of the rejection, Paper No. 20100325 states that,

“Claims 90 and 120 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the enablement requirement. The claim(s) contains [*sic*] subject matter *which was not described in the specification* in such a way as to enable one skilled in the art ... to make and/or use the invention.

¹²⁸

Hyperphase Technologies, LLC v. Google, Inc., Case Nos 07-1125, -1176 (Fed.Cir. 26 December 2007) (Michel C. J.).

Secondly, the specification discloses that the *plurality* of locking members 106a, 107a, 108a are used alternatively and not as a plurality within the same plug. See the specification on page 12, lines 11-13 which clearly recites the use of locking member 106a or 107a or 108a.”¹²⁹

Under current Office practice,

“[t]o satisfy the written description requirement, a patent specification must describe the claimed invention in sufficient detail that one skilled in the art can reasonable conclude that the inventor had possession of the claimed invention”.¹³⁰

The typical issue “raised in the cases is most often phrased as whether the original application provides ‘adequate support’ for the claims at issue or whether the material added to the specification incorporates ‘new matter’ in violation of 35 U.S.C. §132.”¹³¹ Here, no matter has been added to the specification; the issue before the Examining staff is thus, “whether the original application provides ‘adequate support’ for” claims 90 through 120?

The Examining staff premised this rejection of claims 90 through 120 on grounds that,

“the instant specification fails to provide support for the *at least one electromechanical locking member* and *plurality of electromechanical locking members* set forth in claims 90 and 120, respectfully.”¹³²

No other averment is made in support of this rejection. At issue therefore, is “whether the original application provides “adequate support” for the claims at issue”?

¹²⁹ Paper No. 20100325, ¶3.

¹³⁰ *MPEP*, §2163, p. 2100-172 (Rev. 3, August 2005).

¹³¹ *MPEP*, §2163, p. 2100-172 (Rev. 3, August 2005).

¹³² Paper No. 20100325, ¶4, page 3.

Appellant invites the attention of the Examining staff to Figures 2 through 7, and especially to the embodiment of Figure 3 which shows the distal portion 106a surrounding the distal portion 106B of detent 106A. In the language of the original specification, “[t]he open distal end of chamber 80 is intersected by a circumferential groove 101ℓ which may partially, or completely, encircle the exterior circumferential surface of plug 101”,¹³³ “[a]rmature 106a forms the radially outward distal end of solenoid coil 106b, and is radially outwardly biased by spring 106D so as to extend radially upwardly into the path of groove 101ℓ and thereby engage detent 106A”,¹³⁴ and “cavity 106c will surround detent 106A.”¹³⁵ The attention of the Examining staff is further invited to page 14 of the originally filed specification, where Appellant teaches that,

“when an unidirectional electrical current is applied through the particular winding 106b, 107b, 108b, the corresponding shaft 106d, 107d, 108d will either axially reciprocate (*i.e.*, radially through its corresponding chamber 82) along axis A or incrementally rotate (*e.g.*, by ninety degrees within its corresponding chamber 82) around axis A and thereby alter the positional relation between blocking detent 106A or 107A relative to the corresponding blocking armature 106a, 107a or 108a”.¹³⁶

Turning to page 25, Appellant further teaches that,

“The plug is configured with the electrical operator maintaining

¹³³ Original specification, page 12, lines 15 and 16.

¹³⁴ Original specification, page 12, lines 18 through 20.

¹³⁵ Original specification, page 14, line 15.

¹³⁶ Original specification, page 14, lines 5-10.

the distal member within the plug with the distal member extended not beyond the exterior surface while the distal member is in the first position, and maintaining the distal member in engagement with the cylinder while the distal member is in the second position”.¹³⁷

In short, one distal end (of chamber 80)¹³⁸ does in fact *surround* another distal end (of armature 106a)¹³⁹, and, depending upon the “orientation relative to said exterior surface obstructing said relative movement when said distal member at least partially surrounds said distal member.”¹⁴⁰ Alternatively, and referring again to the foregoing excerpts from Appellant’s originally filed specification in conjunction with Figure 3, the distal end of armature 106a and its exposed recess 106c will surround the distal end of detent 106A and, depending upon the “orientation relative to said exterior surface obstructing said relative movement when said distal member at least partially surrounds said distal member.”¹⁴¹ Although the language of claim 11 may be open to an alternate wording, that is not at issue here. In point of fact, the foregoing excerpts demonstrate that Appellant does satisfy both the written description and enablement prongs of the first paragraph of 35 U.S.C. §112 by

¹³⁷ Original specification, page 25, lines 7-10.

¹³⁸ Original specification, page 12, line 15.

¹³⁹ Original specification, page 12, line 18.

¹⁴⁰ Claim 11, penultimate and last lines. With the elected species before the Examining staff, Appellant’s “obstructing said relative movement” may be achieved by causing the “different orientation” which may be either radial or rotational, depending upon both the design of the distal portion of the armature 106a, 107a, 108a, etc. and whether the winding of the coil is that of a solenoid, a rotary motor, or alternatively, a stepping motor, or alternatively, a combination of a radial and rotational change.

¹⁴¹ Claim 11, penultimate and last lines.

describing how to make and use a “distal member” of Appellant’s “electrical operator”, as illustrated in at least three embodiments on 106(a), 107(a) and 108(a) in Figure 1, makes this rejection improper under both the “written description” and “enablement” requirements of the first paragraph. Appellant notes however, that there is no rejection under the second paragraph of §112 of claim 11 in the record before the Examining staff. Furthermore, the rejection is based upon a conclusory statement by the Examining staff; there is no evidence of record of an absence of either (i) a lack of enablement the subject matter of claim 11, of (ii) an absence of a written description the subject matter of claim 11, or (iii) a failure to disclose the best mode for practicing the subject matter of claim 11.¹⁴² Consequently, in view of the satisfaction of the requirement for enablement of the phrases “distal member”, this rejection may not be sustained under the first paragraph of §112.¹⁴³

B. Appellant’s Originally Filed Specification Provides Both A Written Description And Enablement For The Subject Matter Defined By Claims 11 and 12

First, Appellant notes that Paper No. 20100325 contains various assertions that infer that the use of the phrase *at least one*¹⁴⁴ in the Field, *et al.* ‘307 patent means *a plurality* or

¹⁴² *High Concrete Structures, Inc. v. New Enter. Stone And Lime Co.*, 377 F.3d 1379, 71 USPQ2d 1948. 1951, WL 1689152 (Fed. Cir. 29th July 2004).

¹⁴³ Where the meaning of a claim is “reasonably discernable,” the claim is not indefinite. *Bancorp Servs., LLC v Hartford Life Ins. Co.*, 359 F.3d 1367, 69 USPQ2d. 1996 (Fed. Cir. 1st March 2004).

¹⁴⁴ Claim 1 of Field, *et al.* ‘307 reads, in part, “wherein *at least one* electromechanical locking member is disposed within the barrel” Column 9, lines 5 and 6.

more than one. The Examiner has cited no authority under the statute to make this inference. Paper No. 20100325 has failed to demonstrate that the phrase *at least one*¹⁴⁵ as used in the Field, *et al.* '307 patent defines any number other than *one*. Attention of is invited to the complete absence of authority for the Examiner's proposition that the phrase *at least one* means any number other than *one*. Appellant's Figure 1, which displays an array of at least three electromechanical locking members 106a, 107a and 108a, **aligned in a linear array** illustrated, and comprised, of a plurality of locking members, all of which satisfy the definition of a locking member given by Field, *et al.* '307 in column 5, lines 1 through 8, and all or any one of which might be borne by Appellant's array of apertures 80, 82.

Second, Paper No. 20100325 also states that,

“the instant specification fails to provide support for the “at least one electromechanical locking member”¹⁴⁶

Attention is invited to the illustrations in Figures, and especially Figure 1, where three distinct electromechanical locking members 106a, 107a and 108a are individually identified and described, and are collectively illustrated as an array. The structure and operation of each of these locking mechanisms are described in the originally filed specification. The attention of the Examining staff is invited to also note Appellant's express teachings in, among other features, that Integration of an electrical operator with a locking mechanism may be achieved by incorporation of one, or more, of electrical operators 105, 106, 107,

¹⁴⁵ Claim 1 of Field, *et al.* '307, column 9, lines 5 and 6.

¹⁴⁶ Paper No. 53, page 2, paragraph 3.

108¹⁴⁷ such as, to use the simplest of examples, the insertion of electrical operators 105b, 106b, 107b, 108b for pin tumblers 101b, or other types of tumblers,¹⁴⁸ into pin cylinders 80, 82¹⁴⁹. Re-boring of one, or more, of pin cylinders 80, 82 may be necessary when retrofitting an existing lock; this will not require removal or other alteration of cylinder shell 102.¹⁵⁰ In short, Figure 1 illustrates a plurality of apertures (*e.g.*, pin cylinders 80, 82) and a plurality of solenoids 106b, 107b and 108b, together with a plurality of tumbler pins 101b. Alternatively, claims 90 and 120 may be practiced with but a single solenoid 106b, 107b or 108b. In short, there is no basis on the record before the Office to support the assertion of the Examining staff that “the instant specification fails to provide support for the ‘at least one electromechanical locking member’”;¹⁵¹ moreover, the Examining staff has submitted to the prosecution history an administrative record that is singularly devoid of either citation supporting this assertion or other rationale justifying the assertion. This rejection may not therefore be sustained.

¹⁴⁷ Page 22, beginning with line 18.

¹⁴⁸ With a concomitant re-bitting of the corresponding key to omit from the blade of the key any (or each) “tooth corresponding to the cylinder occupied by solenoid 105b”. See, page 20, line 21 and page 21, lines 1 and 2.

¹⁴⁹ Page 21, lines 8 through 11 and page 22, beginning with line 18., as illustrated by Figures 1 and 8A.

¹⁵⁰ Page 21, lines 8-11 expressly teach that “In a particular practice, the diameter of one of pin cylinders 80, 82 may not be sufficiently wide to accommodate a particular solenoid and will require reboring of the cylinder. The rebored plug can still be retrofitted into an already installed cylinder however, without the necessity of removing cylinder 102.”

¹⁵¹ Paper No. 53, page 2, paragraph 3.

In view of these teachings, there is no evidence of record to establish a lack of an absence of either (i) a lack of enablement the subject matter of claims 90 or 120, of (ii) an absence of a written description the subject matter of claims 90 or 120, or (iii) a failure to disclose the best mode for practicing the subject matter of claims 90 or 120.¹⁵² Consequently, in view of the satisfaction of the requirement for enablement of the phrase “distal member”, this rejection may not be sustained under the first paragraph of §112.¹⁵³

Third, the attention of the Examining staff is invited to the description of the *electromechanical locking member* given by Field, *et al.* ‘307:

“[a] plurality of electromechanical locking members 50, 52, 54 preferably are located within the central recess portion 42. The locking members are referred to as electroomechanical because, as described below, there are moved under the force of an electronically powered drive mechanism.”¹⁵⁴

Wholly absent from Field, *et al.* ‘307 is any attribution of any electromechanical characteristic or property to elements 50, 52, 54; Field, *et al.* ‘307 describes elements 50, 52, 54 as passive, rather than active, components. In contradistinction, Appellant’s locking pin 201a is disclosed as a mechanical component made of a ferromagnetic material such as iron, that is moved under the force created by an electronically powered drive mechanism,

¹⁵² *High Concrete Structures, Inc. v. New Enter. Stone And Lime Co.*, — F.3d ----, WL 1689152 (Fed. Cir. 29th July 2004).

¹⁵³ Where the meaning of a claim is “reasonably discernable,” the claim is not indefinite. *Bancorp Servs., LLC v Hartford Life Ins. Co.*, 359 F.3d 1367, — USPQ2d. ____ (Fed. Cir. 1st March 2004).

¹⁵⁴ Field, *et al.* ‘307, col. 5, lines 65 through 67, and col. 6, lines 1 and 2.

namely coil 201b. Alternatively, Appellant's "armature 106a"¹⁵⁵ contains at least one of the "grooves or slots 51, 53, 55" attributed by Field, *et al.* '307 to his "locking members 50, 52, 54."¹⁵⁶ Wholly absent from Paper No. 52 is any explanation of why slots 51, 53, 55 in Field, *et al.* '307 provide enablement under the first paragraph of 35 U.S.C. §112 with each of elements 50, 52, 54 teaching "at least one electromechanical locking member", while slots 107c, 108h and grooves 105n of Appellant's electromechanical components 105D, 106a, 107a and 108a do not similarly provide enablement under the first paragraph of 35 U.S.C. §112 Appellant's electromechanical components into "electromechanical locking members", when Appellant's electromechanical components 105D, 106a, 107a and 108a are disclosed as responding to an electrically driven motor or solenoid by exhibiting movement relative to a detent, or to a sidebar, or other obstruction?

Absent any basis for the Examiner's inference¹⁵⁷, Paper No. 52 fails to satisfy the standard required under 37 CFR §1.104, and is incomplete to the extent that Appellant can not reasonably and accurately comply with the requirement for a Request under 37 CFR §1.607. Accordingly, and in view of the absence of any evidence of record establishing an absence of enablement, this rejection should not be maintained absent completion of an administrative record in compliance with 37 CFR §1.104(a) and (b) which supports this rejection; Appellant has previously requested clarification, via a supplemental to Paper No.

¹⁵⁵ Shown in Figures 2 and 3:

¹⁵⁶ Field, *et al.* '307, col. 5, lines 5 and 6.

¹⁵⁷ See, for example, Paper No. 53, paragraph 3.

20100325, containing:

- An explanation of the meaning of the phrase *at least one*, as used in Paper No. 20100325.
- Identification of authority that establishes that the phrase *at least one* indicates a number greater than one under the second paragraph of 35 U.S.C. §112.
- Identification of authority that supports the Examiner's explanation in the supplemental Paper No. 20100325 of the meaning of the phrase *at least one* stated by the Examiner.
- A written explanation of the difference between an "electricomechanical locking member" and Appellant's "armatures" and "locking pins", as those terms pertain to this application.
- A written identification of the column and line number of Field, *et al.* '307 giving an explanation of any *electromechanical* property and characteristic of elements 50, 52 and 54 that defines a difference between an "electrical element", as those terms pertain to this application.
- A written explanation by the Examiner of why slots 51, 53, 55 in Field, *et al.* '307 convert each of elements 50, 52, 54 into "at least one electromechanical locking member", while slots 107c, 108h and grooves 105n of Appellant's electromechanical components 105D, 106a, 107a and 108a do not similarly convert Appellant's electromechanical components into "electromechanical locking members", when Appellant's electromechanical components 105D, 106a, 107a and 108a are disclosed as responding to an electrically driven motor or solenoid by exhibiting movement relative to a detent, or to a sidebar, or other obstruction?

These requested items of clarification have not been forthcoming; consequently, absent the requested clarification to the contrary, the record before the Examining staff conclusively establishes that more than one art-recognized noun may be used to describe features and components disclosed in Appellant's application. In view of the foregoing explanation and demonstration of enablement under the first paragraph of 35 U.S.C. §112, these rejections should not be sustained. Such action is respectfully requested.

C. The rationale given in Paper No. 20100325 inaccurately interprets that explicit language of Appellant's specification

In the rationale given by Paper No. 20100325 in support of this rejection, the Examiner writes that,

“Secondly, the specification discloses that the *plurality* of locking members 106a, 107a, 108a are used alternatively and not as a plurality within the same plug. See the specification on page 12, lines 11-13 which clearly recites the use of locking member 106a or 107a or 108a.”¹⁵⁸

The passage of Appellant's specification is a part of the *Detailed Description* that discusses the details of Appellant's release mechanism which may be incorporated into Appellant's “electromechanical locks”¹⁵⁹ and “the plugs and cylinders of electromechanical locks,”¹⁶⁰ and references those mechanisms to corresponding drawings. Where the Examiner's rationale has erred is in the endeavoring by the Examining staff to inaccurately interpret the adjective *plurality* by reference to a re-phrasing of a single sentence taken, in isolation, from the entirety from the twenty-eight pages of Appellant's original specification; this resulted in the erroneous interpretation now found in Paper No. 20100325.

In its entirety, the passage cited by the Examiner reads,

A release assembly such as a reciprocating solenoid coil 106b driving blocking armature 106a shown in greater detail in Figures 2 and 3, or a rotary motor 108b driving blocking armature, 108a shown in greater detail in Figures 4 and 5A and

¹⁵⁸ Paper No. 20100325, ¶3.

¹⁵⁹ Original specification, page 1, line 11.

¹⁶⁰ Original specification, page 1, line 11.

5F, or the reciprocating solenoid coil 107b of blocking armature 107a shown in greater detail in Figures 6 and 7, resides within (typically cylindrical) chamber 80.”¹⁶¹

The structure of this passage is written in the disjunctive in order to teach the differences of structure between these constituent components. Moreover, a subsequent sentence within the same paragraph writes about Appellant’s release assemblies 106, 107, and 108 in the conjunctive, aggregately, by stating that:

“Release assemblies 106, 107, and 108 are electrically connected to an electronic logic and control circuit 104b encapsulated within an electrically insulated casing 104 formed to define an outer sector of cylindrical plug 101.”¹⁶²

Still other passages describe these constituent components either disjunctively, or conjunctively; these teachings by Appellant’s original specification is an affirmative rebuttal of the Examiner’s assertion that one passage of Appellant’s specification constitutes a disclaimer of the subject matter of the alternative of the issue of enablement, and the scope of rejected claims 11 and 12.

The fatal flaw in the Examiner’s rationale is that the Examiner is making an untimely argument that Appellant is precluded from recapturing “specific meanings disclaimed during prosecution”¹⁶³, despite the fact that prosecution of the above-captioned application has yet

¹⁶¹ Original specification, page 12, lines 11-15.

¹⁶² Original specification, page 12, lines 120 and 21, and page 13, line 1.

¹⁶³ *Mangosoft, Inc., et al. v. Oracle Corporation*, slip opinion, p. 11.

to conclude.¹⁶⁴ Moreover, in a decision that dwelled upon the correct methodology for judicial interpretation of the language of patent claims, *Festo Corp. v. Shoketsu Kinzoku Kogyo Kabushiki*, 520 U.S. 111 (1979), the claims defined *sealing rings* in the plural, but the accused device had but a single sealing ring. Subsequently, in *Dayco Products, Inc. v. Total Containment, Inc.*, the Federal Circuit recognized that, in context, the plural can describe a universe ranging from one to some higher number, rather than requiring more than one item.¹⁶⁵ In other words, the plural can, and under the first paragraph of 35 U.S.C. §112 lawfully does describe the singular, and *vice-versa*, a disclosure of the singular constituent element enables a plurality of that constituent element.

This holding in *Dayco Products, Inc.* about the enablement of the plural by a disclosure of a single species was again repeated by the Federal Circuit in its decision in *Versa Corporation v. AG-Bag International Limited*.¹⁶⁶ 392 F.3d 1325 (Fed. Cir. 2004).

Consideration should also be given to the efforts of the Commissioner to explain that those,

¹⁶⁴ The issue argued by Paper No. 20100325 is whether Appellant has made a disclaimer or estoppel of Appellant's right to for pending claims 90 and 120 to cover an embodiment which may cover a plurality of those constituent components. This is not an issue to be addressed at this stage of the examination under the first paragraph of 35 U.S.C. §112; rather Paper No. 20100325 should instead focus upon whether Appellant's original specification provides enablement of one of ordinary skill in the art to both make and to use an embodiment which may cover a plurality of those constituent components?

¹⁶⁵ *Dayco Products, Inc. v. Total Containment, Inc.*, 258 F.3d 1317, 1328 (Fed. Cir. 2001).

¹⁶⁶ *Versa Corporation v. AG-Bag International Limited*. ___ F.3d ___ (Fed. Cir. 2004).

“partial figures ... [which] do not show every leg’s offsets and their displacement” in *In re Robert Skvörecz*, ___ F.3d ___ (Fed. Cir. 3 September 2009),

do not provide a lawful basis able to support the finding by the Board,

“that the claim element ‘*a plurality of offsets located* ... located in said first rim’ is not described in the specification”

By analogy, Appellant’s disclosure, and detailed graphic illustration, of a **plurality** of locking members, either in the form of one or more of units 106a, 107a or 108a, or in alternative arrangements of one or more of units 106a, 107a or 108a, are both enabled and are provided with a written description by the originally filed specification and drawings.

In summary, Appellant has demonstrated an affirmative enablement of a plurality of constituent components of Appellant’s locking mechanism, the absence of any disclaimer of any disclaimer or estoppel of Appellant’s right to for pending claims 11 and 12 to cover an embodiment which may cover a plurality of those constituent components, and enablement of one of ordinary skill in the art to both make and to use an embodiment which may cover a plurality of those constituent components. Consequently, Paper No. 20100325 fails to make a *prima facie* showing of a lack of enablement by Appellant’s original specification of an embodiment which may cover a plurality of *locking mechanisms*. This rejection should not, therefore, be sustained. Such action is respectfully urged.

B. Claim 10 is rejected under the second paragraph of 35 U.S.C. §112 for lack of

antecedent basis.

Specifically, the Examiner states that in claim 10, line 9, there is no antecedent basis for “the side bar.” Accordingly, claim 10 is being amended to overcome this rejection, thereby removing one issue newly raised in Paper No. 20100325 and placing claim 10 in better form for appeal. Entry of this amendment, in part, is respectfully requested.

Rejection of Claims 9 through 12 under 35 U.S.C. §103

Claims 9 through 12 are once again rejected under 35 U.S.C. §103(a) as being rendered obvious, and thus unpatentable, over the Examiner’s proposed combination of Gokcebay, U.S. Patent No. 5,552,777 in view of Thordmark *et al.*, U.S. Patent No. 5,542,274 and Naveda, U.S. Patent No. 4,416,127. Appellant respectfully traverses this rejection for the following reasons.

Claim 9

First, the proposed combination fails to make a *prima facie* showing of obviousness. Specifically, the proposed combination is singularly devoid of any teaching or suggestion of Appellant’s:

“an electronically powered drive mechanism cooperating with the electromechanical locking member to selectively move the locking member from the barrel blocking position to the non-barrel blocking position in which the side bar engages the locking member to rotate the barrel and operate the

lock.”

Furthermore, neither the primary reference nor the secondary reference show any interaction between:

- “an electromechanical locking member substantially entirely contained with the barrel member,” or
- “an electronically powered drive mechanism cooperating with the electromechanical locking member to selectively move the locking member ... [to a] position in which the side bar engages the locking member,” or
- “an electronically powered drive mechanism cooperating with the electromechanical locking member to selectively move the locking member from the barrel blocking position to the non-barrel blocking position ...,” or
- “an electronically powered drive mechanism cooperating with the electromechanical locking member to selectively move the locking member from the barrel blocking position to the non-barrel blocking position in which the side bar engages the locking member.”

In short, the Examiner’s proposed combination can not alter the primary reference to incorporate the foregoing features of claim 9 without impermissibly preventing the primary reference for operating in its intended mode in which “bore or recess 50 into which the

blocking pin 38 extends in the blocking position.” Gokcebay ‘777, column 6, lines 45 and 46.

The fact that Examining staff has repeatedly ignored, and continues to fail to grasp this deficiency in the Examiner’s proposed combination, is itself convincing evidence of non-obviousness.

Moreover, the simple observation that any cooperation of the “small solenoid 36” of Gokcebay ‘777” with a side bar would impermissibly prevent Gokcebay ‘777 from operating in its intended mode in which “bore or recess 50 into which the blocking pin 38 extends in the blocking position,” as is described by Gokcebay ‘777, column 6, lines 45 and 46, is therefore, convincing and persuasive indicia of the non-obviousness of claim 9.

Claim 10

The Examiner’s proposed combination fails to make a *prima facie* showing of obviousness. Specifically, the proposed combination is singularly devoid of:

- claim 10’s “an electromechanical locking member ... substantially entirely contained within the barrel member,” or
- claim 10’s “electronically powered drive mechanism located within the barrel member moving the electromechanical locking member to a position in which the groove of the locking member is aligned to receive the side bar.”

Any modification of the primary reference to meet either of these features, would

impermissibly preventing the primary reference for operating in its intended mode in which “bore or recess 50 into which the blocking pin 38 extends in the blocking position.” Gokcebay ‘777, column 6, lines 45 and 46.

The fact that Examining staff has repeatedly ignored, and continues to fail to grasp this deficiency in the Examiner’s proposed combination, is itself convincing evidence of non-obviousness.

Moreover, the simple observation that any cooperation of the “small solenoid 36” of Gokcebay ‘777” with a side bar would impermissibly prevent Gokcebay ‘777 from operating in its intended mode in which “bore or recess 50 into which the blocking pin 38 extends in the blocking position,” as is described by Gokcebay ‘777, column 6, lines 45 and 46, is therefore, convincing and persuasive indicia of the non-obviousness of claim 10.

Claims 9 through 12

Third, Appellant notes that the Examining staff applied the same combination of art to Appellant’s copending divisional application, Serial No. 08/720,070. There, Appellant observed that the rejection is untenable under 35 U.S.C. §103(a) when the Examiner’s proposed combination of Gokcebay, U.S. Patent No. 5,552,777 modified according to Thordmark *et al.*, U.S. Patent No. 5,542,274 and Naveda, U.S. Patent No. 4,416,127, is carefully considered. Accordingly, Appellant respectfully traverses this rejection for the following reasons:

The proposed combination is improbable, is unsupported by any evidence of

motivation in the record before the Examiner, and fails to provide a *prima facie* showing of obviousness; the Examiner is respectfully urged to refuse to sustain this rejection for the following reasons.

A. The Rejection Under 35 U.S.C. §103 Errs By Considering The Individual Component References Of The Proposed Combination Piecemeal, And Thus Failing To Consider The Proposed Combination As A Single Entity

1. The Proposed Combination of Prior Art Fails to Make a *Prima Facie* Showing of Obviousness

In assembling the three exemplars of the art drawn to form the Examiner's proposed combination, Paper No. 2010325 makes a piecemeal consideration each reference, and merely identifies individual teachings about those references, thus failing to consider the proposed combination. By way of example of the flaw in this failure, Paper No. 20100325 erroneously reasons that,

“Naveda reinforces that one having ordinary skill in the art ... would have known of the versatility and interchangeability of known elements usable in verifying and actuating electric lock cylinders including among others, miniature coils, miniature electromagnets, electronic memories [*sic* ,] bioelectric circuits, resistance plates and the like (col. 3, line 1-13 and col. 4, lines 30-35).”

Based upon this casuistry, Paper No. 2010325 erroneously concludes that therefore,

“It would have been obvious to one of ordinary skill in the art to replace the simple blocking element of Gokcebay with the multi-part electrically actuated blocking element of Thordmark *et al.* to thwart natural attempts to force system locks that are equipped with electronic blocking functions, of the kind meant by Thordmark (col. 1, lines 38-42), by making forcing of such locks more difficult. It would have further been an obvious reversal of parts and change of size to select miniature logic

circuitry and a miniature solenoid and locking member 11 such that the blocking mechanism fits within a conventional sized lock plug as taught by Gokcebay and Naveda.”

Evidence present in the administrative record of this prosecution history does not support this conclusion-of-law.

The fallacy of Paper No. 20100325’s casuistry lies in the observation that regardless of the use of the term “miniaturization” by the proposed combination, the source of this term, Naveda ‘127, teaches “a practical embodiment” that, as illustrated by Naveda ‘127’s Figure 10, three (3) parallel rotating shafts, as opposed to the single rotating cylinder plugs of Appellant’s, Gokceby U.S. 5.522.77 and Thordmark U.S. 5.542.274.

Utterly unexplained in Paper No. 20100325 is precisely how a **tripling** of the number of parallel rotating components might be said to teach “miniaturization” in any sense of that word?

Appellant invites the Board to observe that “miniaturization” is not a term taken from the finally rejected claims, and absent from the administrative record is precisely what the proposed combination incorporating the teachings of Naveda ‘127 and its magnetic features contributes to the proposed combination. Appellant respectfully suggests that Naveda ‘127 and its teachings are immaterial to the finding-of-fact upon which the conclusion of obviousness are grounded by Paper No. 20100325.

Moreover, in the Examiner’s proposed combination, nothing teaches either:

“an obvious reversal of parts and change of size”; or

“an obvious ... change of size; or

how “to select miniature logic circuitry and a miniature solenoid and locking member 11 such that the blocking mechanism fits within a conventional sized lock plug.”

Although these deficiencies in the Examiner’s proposed combination are merely exemplary of the inadequacy of the prior art to render Appellant’s claims obviousness, these deficiencies illustrating the glaring incompleteness of in the Examiner’s refusal to consider the “subject matter sought to be patented as a whole” and the “differences between the subject matter sought to be patented and the prior art” as is mandated by 35 U.S.C. §103(a).

Equally unclear is why the pending claims raise questions of “reversal or parts” or “change of size” or whether the practice of the pending claims would raise an issue of whether embodiments of these claims would provide a “blocking mechanism fits within a conventional sized lock plug”? Appellant submits that the Examiner appears to have lost sight of the definitions of the pending claims as well as the explicit requirement of 35 U.S.C. §103(a) that the “subject matter sought to be patented” be considered “as a whole.”

2. The Interpretation of the Prior Art and the Subject Matter Sought to be Patented Fails to Consider the Subject Matter As a Whole As Required by 35 U.S.C. §103(a)

Appellant further submits therefore, and ignoring *arguendo* the absence of any teaching for making the Examiner’s proposed combination except an impermissible hindsight reconstruction in the light provided by Appellant’s rejected claim, Appellant’s pending claims define a patentably distinguishable structure, and process, constructed of

non-obvious constituent components arranged to provide a non-obvious internal cooperation not found among the decades of prior art.

Claim 9

Where, for example, in the Examiner's proposed combination, is Appellant's "*locking mechanism substantially entirely contained within the barrel member ... being positionable to permit the side bar to engage the locking member*" in combination with Appellant's "providing an electronically powered rotatable barrel," as defined by claim 9?

Claim 10

Where is Appellant's "rotatable lock barrel ... comprising ... an electromechanical locking member ... disposed in the recess of the barrel member and ... substantially entirely contained within the barrel member?"

These deficiencies in the art are glaring, and scream against the Examining staff's inadequate compliance with 35 U.S.C. §103(a). Consequently, the explicit teachings of the Examiner's proposed combination fail to provide the combination asserted by Paper No. 20100325.

Paper No. 20100325's proposed combination can not meet these features of claims 9 and 10 without impermissibly modifying the primary reference in a manner that prevents the primary reference from operating in its intended mode by confining the structure of the proposed combination *substantially entirely contained within the barrel member* and thereby eliminating the,

"bore or recess 50 into which the blocking pin 38 extends in the

blocking position,”¹⁶⁷

where the,

“bore or recess 50 is easily formed by drilling a hole through the cylinder shell 46 or forming an internal recess or groove on the inside surface of the **cylinder shell**” 46.¹⁶⁸

This functional mode is critical to the intended operation of the primary reference in order to assure provision of,

“a retractable blocking means [*i.e.*, blocking pin 38] which blocks opening of the lock’s bolt *separately from* the mechanical bitting”¹⁶⁹

Overlooked by Paper No. 20100325 is that the terms of claims 9 through 12 have art recognized meanings. By way of example, neither the “blocking pin 38”¹⁷⁰ nor “latching element 10”¹⁷¹ of the proposed combination are synonymous or interchangeable with Applicant’s “side bar,” defined by Class 70, Subclasses 495, 496 as, respectively:

491 Sliding tumblers:

This subclass is indented under subclass 490. Device wherein

¹⁶⁷ Gokcebay 5,552,777, col. 6, lines 45-46.

¹⁶⁸ Gokcebay 5,552,777, col. 6, lines 49-51.

¹⁶⁹ Gokcebay 5,552,777, col. 2, lines 18-19.

¹⁷⁰ Gokcebay 5,552,777, Figures 4 and 5.

¹⁷¹ Thordmark 5,542,274, Figures 4 and 5, or 7.

the movable impediments to relative rotation between the plug and the cylinder (i.e., the tumblers) move in a slidable fashion:

492 Transverse of plug:

This subclass is indented under subclass 491.

Device wherein the impediments move in a direction which is crosswise of the plug.

495 Including sidebar:

This subclass is indented under subclass 492. Device wherein structure, frequently in the nature of a shaft-like element, is included, and wherein the structure serves as an additional impediment to rotation of the plug relative to the cylinder by extending across, at one or more locations, the circular line of demarcation (i.e., the shear line) along which the plug turns relative to the cylinder.

(1) Note. The movement of the sidebar to a non-blocking position requires the repositioning of the tumblers to a location where a means (*e.g.*, a recess) thereon can receive a portion of the sidebar, thus enabling the latter to move clear of the shear line.

(2) Note. In some instances, the tumblers do not move in such a manner as to block the shear line; therefore, the sidebar is not, in those instances, an additional impediment.

and,

490 Rotary plug:

This subclass is indented under subclass 357.

Device wherein the movable part comprises a rotary plug.

491 Sliding tumblers:

This subclass is indented under subclass 490. Device wherein the movable impediments to relative rotation between the plug and the cylinder (i.e., the tumblers) move in a slidable fashion.

496 Including sidebar:

This subclass is indented under subclass 491.

Device wherein structure, frequently in the nature of a shaft-like element, is included, and wherein the structure serves as an additional impediment to rotation of the plug relative to the cylinder by extending across, at one or more locations, the circular line of demarcation (i.e., the shear line) along which the plug turns relative to the cylinder.

(1) Note. See (2) Note of subclass 495 above, which Note is equally applicable here.

Neither the “blocking pin 38” nor “blocking element 11”¹⁷² of the proposed combination are able to both serve “as an additional impediment to rotation of the plug relative to the cylinder by extending across, at one or more locations, the circular line of demarcation (i.e., the shear line) along which the plug turns relative to the cylinder” and preserve the ability of the primary reference to operate in its intended mode while concomitantly achieving the stated

¹⁷² Thordmark 5,542,274, Figures 4 and 5, or 7.

object of the primary reference to assure provision of,

“a retractable blocking means [*i.e.*, blocking pin 38] which blocks opening of the lock’s bolt *separately from* the mechanical biting”¹⁷³

The “common sense” approach of recent efforts by the U.S. Court of Appeals for the Federal Circuit¹⁷⁴ in this field is unavailable here where the evidence present in the administrative record, which is itemized in the annexed Evidence Exhibit, namely one hundred and fifty-eight (158) discrete items of prior and contemporary art in the same field of endeavor originating from eight (8) distinct patent authorities, suggest Appellant’s combination of “rotatable lock barrel ... comprising ... an electromechanical locking member ... disposed in the recess of the barrel member and ... substantially entirely contained within the barrel member ... permitting a side bar to move into and out of engagement with the ... locking member for selectively permitting and blocking rotation”

Furthermore, Gokcebay et al. itself, as is evidenced by Gokcebay U.S. 6,000.609, did not advance along a “common sense” path advocated by Paper No. 20100325, even though both Gokcebay ‘777 and the later Gokcebay ‘609 both devote two full paragraphs, respectively, column 2, lines 7 through 48, and column 4, lines 10 through 58, to a technical discussion of Appellant’s work.

In point-of-fact, the administrative record conclusively demonstrates the absence of

¹⁷³ Gokcebay 5,552,777, col. 2, lines 18-19.

¹⁷⁴ *Philip W. Wyers, et al. v. Master Lock Co.*, ___ F.3d ___ (Fed. Cir. 22 July 2010)

evidence which would support the conclusion-of-law made by Paper No. 20100325.

The Board is respectfully invited to observe that although these one hundred and fifty-eight items of material art have been present in the administrative record for years, none has been recognized by the Office as negating the conclusion -of-law maintained by the Office.

Accordingly, absent substantial evidence in the administrative record which would lend support to the conclusion-of-law, and in the presence of overwhelming evidence of record which demonstrates an absence in the art of the obviousness advocated by Paper No. 20100325, this rejection should not be sustained.

B. The Rejection Under 35 U.S.C. §103 Ignores The Explicit Requirements Of 35 U.S.C. §103(a) For A Showing Of Obviousness

The Examiner should pause to consider that Appellant's claim 1, by way of example, is not the type of claim found in *KSR Int'l Co. v. Teleflex Inc.*¹⁷⁵ were every element, that is, both the electrical switch and the brake petal assembly, were standard off-the-shelf items that had been previously used in the same industry, for the same purpose, for many years, to achieve the same result. In *KSR*, neither the claim when read in its entirety, nor the two paragraphs that defined the switch and assembly, did anything more. Consequently, and in conformance with the precedential principles laid down by *Hotchkiss v. Greenwood*,¹⁷⁶ affirmed its principle of the "functional approach" that "[t]he combination of familiar

¹⁷⁵ *KSR Int'l Co. v. Teleflex Inc.*, 127 S.Ct. 1727, 1739, 82 USPQ2d @1395 (2008).

¹⁷⁶ *Hotchkiss v. Greenwood*, 11 Howard 248.

elements according to known method is likely to be obvious when it does no more than yield predictable results.”¹⁷⁷

Here, and unlike *KSR*, the Examining staff has failed to show that not even one of the constituent elements of Appellant’s claims 9 or 10 has ever been known in the art, and has failed to show either the structure of Appellant’s claim 9:

- “an electronically powered drive mechanism cooperating with the electromechanical locking member to selectively move the locking member from the barrel blocking position to the non-barrel blocking position in which the side bar engages the locking member to rotate the barrel and operate the lock,” or
- “an electromechanical locking member substantially entirely contained with the barrel member,” or
- “an electronically powered drive mechanism cooperating with the electromechanical locking member to selectively move the locking member ... [to a] position in which the side bar engages the locking member,” or
- “an electronically powered drive mechanism cooperating with the electromechanical locking member to selectively move the locking member from the barrel blocking position to the non-barrel blocking position ... ,” or

¹⁷⁷

Ex parte Mary Smith, Appeal No. 2007-1925 (BPAI 2007).

- “an electronically powered drive mechanism cooperating with the electromechanical locking member to selectively move the locking member from the barrel blocking position to the non-barrel blocking position in which the side bar engages the locking member,”

or Appellant's claim 10's:

- “an electromechanical locking member ... substantially entirely contained within the barrel member,” or
- “electronically powered drive mechanism located within the barrel member moving the electromechanical locking member to a position in which the groove of the locking member is aligned to receive the side bar.”

These structural features and the foregoing results attained by these operational functions performed by this structure of claims 9 and 10 have never existed in the art outside of Appellant's specification. The Examiner is urged to consider that the procedural standard established by 35 U.S.C. §103(a) requires that “the *differences* between the subject matter sought to be patented and the prior art” must be identified; that standard has not been met here where the outstanding Office action as attributed to the Examiner's proposed combination the nomenclature, operational functions and results attained when these properties can not be found by a thorough reading of that proposed combination. To paraphrase the Board of Appeals, how may this art be said to teach these features of claims

9 or 10 when that art does not use the words that are customarily and invariably used in this field of art to defined these aspects and features of claims 9, 10, 11 or 12?

These deficiencies in the art are the “differences” which must be identified under 35 U.S.C. §103(a). Absent any identification of these “differences” in the administrative record for this application, the procedural standard of 35 U.S.C. §103(a) has not been met. Consequently, there is no *prima facie* showing of obviousness on the administrative record before the Office. Withdrawal of this rejection is therefore respectfully urged.

C. The Rejection Under 35 U.S.C. §103 Fails To Make A *Prima Facie* Showing Of Obviousness

According to MPEP 706.02(j), the following establishes a *prima facie* case of obviousness under 35 U.S.C. §103:

To establish a *prima facie* case of obviousness, three basic criteria must be met. First, there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or to combine reference teachings. Second, there must be a reasonable expectation of success. Finally, the prior art reference (or references when combined) must teach or suggest all the claim limitations. The teaching or suggestion to make the claimed combination and the reasonable expectation of success must both be found in the prior art and not based on Appellant's disclosure. *In re Vaeck*, 947 F.2d 488, 20 USPQ2d 1438 (Fed. Cir. 1991).

These standards imposed by MPEP §706.02(j) are not met, as is demonstrated by the following cursory review of the explicit language of the pending claims.

Third, the earlier noted fact that the Examiner's proposed modification of the primary reference would prevent the primary reference from being operated in its intended mode of

operation, is itself convincing *indicia* of the non-obviousness of these claims.¹⁷⁸

Fourth, there is no evidence of record for modifying the primary reference in the manner asserted by the Examiner, except through a hindsight reconstruction of the art in the light provided by Appellant alone. In the Examiner's proposed combination, only Thordmark '274 discloses a movable locking member cooperating with any electrical operator; that movable locking member 11, as well as "latching member 10", is however, borne by the cylinder shell, and not, as defined by Appellant's claims, borne by, or mounted upon, the plug. Naveda '127, which is a rather large case lock, in terms of the physical volume occupied by shell, or housing, of the lock in comparison to the primary reference, is utterly devoid of any cylinder plug, is bereft of a suggestion of a detent or sidebar, and contributes nothing to this proposed modification of the primary reference.

Moreover, Naveda '127 requires at least a width adequate to accommodate three (3) radially spaced-apart axes, unlike any of the other references.

In short, there is no evidence of record showing motivation for making the Examiner's proposed combination, and Naveda '127 does nothing to suggest miniaturization or other remedy these deficiencies noted in the primary and secondary references. The Federal Circuit has repeatedly emphasized that:

"[t]he test for obviousness is not whether the features of one reference may be bodily incorporated into another reference...

¹⁷⁸ The Examiner's proposed combination would impermissibly prevent the primary reference from operating in its intended mode of operation by obstructing the ability of the "block pin 38" of "small solenoid 36" of the primary reference to engage its cylinder shell 46.

Rather, we look to see whether combined teachings render the claimed subject matter obvious.” *In re Wood*, 599 F.2d 1032, 202 USPQ 171, 174 (CCPA 1979) (citing *In re Bozek*, 416 F.2d 1385, 1390, 163 USPQ 545, 549-50 (CCPA 1969); *In re Mapelsden*, 329 F.2d 321, 322, 141 USPQ 30, 32 (CCPA 1964).

Here, there is no actual teaching in the Examiner’s proposed combination for shifting “a spring biased sidebar 10” anywhere; the primary reference does not require a sidebar and can not fit a sidebar between its blocking pin 38 and its recess 50 without interfering with functional operation; Thordmark ‘274 already has a “side-bar 7” which has no disclosed relation with its “electronic operator 12”; and Naveda ‘127 neither discloses nor indicates any need for a sidebar, whether biased or unbiased.¹⁷⁹ Absent the requisite evidence of motivation for making the Examiner’s proposed combination, this rejection may not be sustained.¹⁸⁰

Alternatively, if the Examiner has intended to assert that the proposed combination may be constructed with a wholesale substitution of “electrical operator 12, a movable electronic [*sic*] locking member 11” and latch 10 for the primary reference’s “electrical

¹⁷⁹ The Examiner’s reliance upon Naveda ‘127 as ostensibly teaching miniaturization is evidence of a misguided understanding of the relevant art: the structure of the case lock taught by Naveda ‘127 is necessarily huge, and substantially external to any cylinder component, when compared to the cylinder locks of Appellant and the primary reference.

¹⁸⁰ To establish a *prima facie* case of obviousness, three basic criteria must be met. First, there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or to combine reference teachings. ... The teaching or suggestion to make the claimed combination and the reasonable expectation of success ***must both be found in the prior art and not based on Appellant’s disclosure***. *In re Vaeck*, 947 F.2d 488, 20 USPQ2d 1438 (Fed. Cir. 1991). Emphasis added.

operator 36 ... [and] member 38”, the Examiner’s proposed combination is flawed because it impermissibly prevents the primary reference from operating in its intended mode of operation with “a bore or recess 50 [drilled into, or preferable through cylinder shell 46] into which blocking pin 38 extends in the blocking position” (*i.e.*, to directly and securely engage the cylinder shell) and concomitantly impermissibly prevents the primary reference from retentively holding “blocking pin 38” in a retracted position when energized.¹⁸¹ There is no evidence of record teaching this construction and concomitant modification of Gokcebay ‘777, except that provided by Appellant’s claims alone among the art.¹⁸² The mandate for completeness in the administrative record set forth 37 CFR §1.104(a), (b) and (c) has not been met here because Paper Nos. 39 and 53 fail to explain how the proposed combination might be constructed to preserve the teaching of the primary reference for “a bore or recess 50 [drilled into, or preferable through cylinder shell 46] into which blocking pin 38 extends in the blocking position” (*i.e.*, to directly and securely engage the cylinder shell) and concomitantly impermissibly prevents the primary reference from retentively holding

¹⁸¹ Under U.S. practice, these teachings of Gockebay ‘777 may not be ignored by the Examiner when constructing the proposed combination. According to MPEP §2141.02, “A prior art reference must be considered in its entirety, *i.e.*, as a whole, including portions that would lead away from the claimed invention. *W.L. Gore & Associates, Inc. v. Garlock, Inc.*, 721 F.2d 1540, 220 USPQ 303 (Fed. Cir. 1983), cert. denied, 469 U.S. 851 (1984). Construction of the Examiner’s proposed combination to eliminate these features of Gockebay ‘777 is improper under 35 U.S.C. §103(a).

¹⁸² The Examiner’s “obvious reversal of parts and change of size to select miniature logic circuitry and a miniature solenoid and locking member 11 such that the blocking mechanism fits with a conventional sized lock plug as taught by Gokcebay and Naveda” is fictitious and illusory, because there is no evidence of record which either teaches or suggest the “obvious reversal.”

“blocking pin 38” in a retracted position when energized. Clarification was previously requested, but was not provided. Consequently, the record before the Examiner does not support this rejection. Refusal to sustain this rejection is respectfully requested.

Under 35 U.S.C. §103(a),

“combining prior art references without evidence of such a suggestion, teaching, or motivation simply takes the inventor’s disclosure as a blueprint for piecing together the prior art to defeat patentability. *In re Dembiczak*, 175 F.3d 994, 50 USPQ.2d 1614 (Fed. Cir. 1999).

Consequently, this alternative construction is untenable, not only because it impermissibly prevents the primary reference, as modified by the two secondary references, from operating in its intended mode of operation, but also because neither of the two secondary references provide the specific motivation to construct Appellant’s “a plug” with, among other features, “a detent disposed between said plug and a cylinder ... an electrical operator borne by ... and rotating with said plug ... releasing said detent to move” Given this failure of a *prima facie* requisite showing of the obviousness under the criteria of §706.02(j) of the *Manual*,¹⁸³ the Examiner is respectfully requested to refuse to sustain this rejection.

In other words, the record fails to show either a *prima facie* teaching or obviousness

¹⁸³ To establish a *prima facie* case of obviousness, three basic criteria must be met. First, there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or to combine reference teachings. ... The teaching or suggestion to make the claimed combination ... **must ... be found in the prior art and not based on Appellant’s disclosure.** *In re Vaack*, 947 F.2d 488, 20 USPQ2d 1438 (Fed. Cir. 1991).

or motivation necessary to construct the Examiner's proposed combination. The Examiner is therefore urged to refuse to sustain this rejection.

D. The Rejection Under 35 U.S.C. §103(a) Fails To Give Full Faith And Credit To The Examiner's Earlier Determination Of Patentability Of Appellant's Claims 9 and 10

U.S. practice as "codified" by §706.04 of the *Manual of Patent Examining Practice*, 8th Edit., Rev. 8 (September 2010) states that,

"[f]ull faith and credit should be given to the search and action of a previous examiner unless there is a clear error in the previous action or knowledge of other prior art. In general, the examiner should not take an entirely new approach or attempt to reorient the point of view of a previous examiner"

The administrative record establishes that Appellant's:

"claim 9 ... is copied verbatim from claim 19 of Field '307, and claim 10 is copied verbatim from claim 14 of Field '307."

Field U.S. Patent No. 5,839,307 for an *Electromechanical Cylinder Lock With Rotary Release* by Medeco Security Locks, Inc., Salem, Virginia, was passed to issue by the same Examiner, and was issued on the 24th of November 1998, on a U.S. Patent application filed on the 13th of June 1997, substantially later than Appellant's provisional applications 60/004,594 filed on the 29th of September 1995 and 60/011,764 filed on the 12th of February 1996, and Appellant's parent application filed on the 27th of September 1996.

The administrative record is devoid of factual evidence which would suggest that the instant Examiner made a “clear error” under §706.04 of the *Manual*. Consequently, this rejection of Appellant’s claims 9 and 10 may not be sustained under 35 U.S.C. §103(a).

Such action by the Board is respectfully urged.

E. The Rejection Under 35 U.S.C. §103(a) Fails To Give Consideration To All Of The Factual Evidence Present In The Administrative Record

The Examining Staff relies upon Thordmark ‘247 to modify the primary reference with its teaching of “the electrically actuated blocking element be mounted in the cylinder shell and not in the plug”¹⁸⁴; the Examining Staff expressly acknowledges that “Gokcebay recognizes the existence of electrode-mechanical locks having the blocking tumbler mounted in the cylinder casing like Thordmark et al. Indeed, the administrative record of this prosecution history list seventeen references cited by Gokcebay ‘777 and an additional five European and Swiss references cited by Thordmark ‘247, which overwhelmingly demonstrate that it was extremely common in the art for several decades to teach (1) the use of side bars, detents and blocking elements within a recess between a cylinder plug and a cylinder shell and (2) the positioning of an “electrically actuated blocking element being mounted in the cylinder shell and not the plug”¹⁸⁵

The earliest of these references, Peters, U.S. Patent No. 3,241,344 clearly

¹⁸⁴ Examiner’s Answer, page 17.

¹⁸⁵ Examiner’s Answer, page 17.

demonstrates the combination of a "side bars 20", which Peters '344 describes at column 2, lines 14, 15, as being conventional and described by U.S. Patent No. 2,040,762 issued on 23 August 1960 to T. H. Johnstone, for its retracting sidebar type cylinder lock, in combination with a "solenoid 38" secured "by screws to casing 36 and operatively associated with shell 34 so that the shell provides an armature operable when the solenoid is energized to move member 30 outward to an unlocked position of blocking relation with extended sidebar 20. A coil compression spring 40 seats between the wall of the solenoid and shoulder 44 of member 30 to bias the member into its locking or blocking position."¹⁸⁶ This alone serves as a un rebuttable evidence that a person of ordinary skill in the art such as the inventor of the primary reference, was very familiar with the ability of a solenoid to interact with a detent, but did not appreciate the advancement of retrofitting while minimizing cost as well as the manufacturing steps of the retrofitting by incorporating a detent or sidebar into his invention as disclosed in Gockebay '777. This admission is further demonstration of the non-obviousness of the pending claims at the very of point of novelty where Appellant departed from the art, in the same manner as was found by the *Corp Eibel Process Machinery v. Minnesota Manufacturing*, 261 U.S. 45 (1923).

In *Eibel Process*, claims 1¹⁸⁷ through 3, 7, 8 and 12 before the Court defined a

¹⁸⁶ Peters '344, column 2, lines 40-48.

¹⁸⁷ Claim 1, by way of example, read "A Fourdrinier machine, ahving the breast roll end of the paper-making wire maintained at *a substantial elevation above* the level, whereby the stock is caused to travel by gravity, rapidly in the direction of movement of the wire, at a speed approximately equal to the speed of the wire, substantially as described." Other claims were shorter in text and broader in scope.

“Fourdrinier machine” which “has for many years been well known and most widely used for making news print paper. ... These machines are very large, some of them weighing more than 1,000,000 pounds Speed, which increases production, is therefore of the highest importance.” In a Fourdrinier machine, a continuous stream of papermaking stock of fibers of wood pulp mixed from 135 to 200 times their weight of water of the consistency and fluidity of diluted milk, is discharged from a flow box or pond, at what is called the “breast roll” at one end of the machine, onto a moving sieve known as “wire” of about 70 feet in length and often more than 100 inches in width, with a working length of about 30 feet. The process is stimulated to shake the wire.

The evidence before the Court established that before Eibel entered the field, continued high speeds in the wire of the Fourdrinier machine much beyond 500 feet a minute resulted in the production of defective paper. “What Eibel tried to do was to enable the paper maker to go to 600 or 700 feet and above in speed and retain a good product.”¹⁸⁸ Eibel accomplished this by raising “the pitch of the wire from 2 or 3 inches to 12 inches, and greatly increased the speed, with a satisfactory product, and in that month he applied for a patent.”¹⁸⁹ According to the Court, Eibel’s modification spread throughout the papermaking industry “like wildfire.”¹⁹⁰ Moreover, there “were those who hesitated to take the venturesome step to give such an unheard-of-pitch to the wire, and waited until others

¹⁸⁸ *Eibel Process*, 261 U.S. @ 54.

¹⁸⁹ *Eibel Process*, 261 U.S. @ 45.

¹⁹⁰ *Eibel Process*, 261 U.S. @ 45.

assumed the risk ... ”¹⁹¹

The issue before the Court in *Eibel Process* was “first and foremost ... whether this was a real discovery of merit”?¹⁹² The Court held Eibel’s claims to be valid and infringed.

References such as Figure 1 of the Clarkson, U.S. Patent No. 4,712,398, serve as evidence of the state of the art such as was carefully developed by the Court in *Eibel Process*;¹⁹³ Clarkson ‘398 is an additional reference evidencing the incorporation of a solenoid, denominated as release assembly 70, and its “laterally oriented locking pin 72” extending from the cylinder shell into “cylinder plug 55.”¹⁹⁴ These features are further described in the later issued Clarkson, U.S. Patent No. 4,789,859 and are illustrated in detail in Figures 2, 6A through 7 thereof.

The Vaden Hans-Dieter, European Patent Publication No. 0303849 B1 reference published in February 1989, further demonstrates the knowledge in the art of a “built-in solenoid (11)” mounted with the cylinder housing 1 to engage cylinder core 3. The Kruhn Jurgen, European Patent Publication No. 0281507 A3 published in September 1998 also demonstrates “an electro magnet (13) arranged in the cylinder housing (12), while the Von Lanthen Mao, PCT Publication No. 805853 A1 published during August 1988 illustrates an

¹⁹¹ *Eibel Process*, 261 U.S. @ 45.

¹⁹² *Eibel Process*, 261 U.S. @ 52.

¹⁹³ In *Eibel Process*, the Court turned to references such as “a patent granted to Barrett and Horne ... in 1899, and other exemplars of the art to shown that “the pitch of the wire in it could not have exceeded 3 inches”

¹⁹⁴ Clarkson ‘398, column 4, lines 62-69.

electro mechanical cylinder lock with an electric coil 11 and magnet bolt 12 serving as part of a blocking device 6 which, through release ball 12 and holding pin 15, engages rotor 5 of the lock.

Klein Haeny Arno, PCT Publication No. 8204459 A1 published during December 1985, additionally illustrates "a magnetic bolt [which] has a movable an electro magnetically operable locking member which, in conjunction with the locking part arranged on the rotor of a lock cylinder, blocks and releases the rotor, independent of the mechanical tumblers" In summary, all of these references illustrate a certain consistency with the teachings of the secondary reference, and emphasize the deficiencies in the Examiner's proposed combination; only Appellant's claims define a cooperation between electrical operator borne by the core, or plug of a cylinder lock and a detent, or sidebar. The effort by the Examining Staff to disassemble solenoid 35 of the primary reference into its several constituent parts¹⁹⁵ in a effort to reconstruct Appellant's claims ignores the fact that absent its armature 38, solenoid 35 is simply a coil unable to meet the movement defined by Appellant's claims is a misguided effort to ignore the "differences between the subject matter" defined by the claims and the prior art as is required by 35 U.S.C. §103(a), and an inexcusable failure by the Examining staff to comply with the mandate of 35 U.S.C. §103(a) to consider the subject

¹⁹⁵ "Gokcebay teaches all of the elements of the claimed invention including a cylinder shell 20, plug/barrel 24, elongate members (conventional pin tumblers in bores 52-col.6, lines 61-62), a key engaging surface provided in the keyway and in the housing contact/conductor 28 in Fig.3, a radially oriented aperture which houses a solenoid/electrical operator 36 with a spring biased (48) movable member comprising a bar/detent/blocking pin 38, and electronic logic circuit (fig. 2, col. 5, line 56 to col. 6, line 37)." *Examiner's Answer*, page 17.

matter of Appellant's claims "as a whole." The assertions by the Examining Staff that the secondary references remedy the deficiencies in the primary reference¹⁹⁶ ignores the fact that the secondary references such as Thordmark '274 are nothing more than a single reference selected from among the plethora of references discussed by both Gokcebay '777 and Thordmark '274 from among numerous others, which teach a solenoid mounted in a cylinder shell, or casing, to act upon a sidebar. Both Gokcebay '777 and Thordmark '274 were well acquainted with such art, and in point of fact, openly discussed such art in specifications. The fact is that the teachings of Gokcebay '777 can not accommodate a sidebar between the armature 38 of his solenoid 35 and his recess 50 without compromising the integrity of his lock. Consequently, the proposition advanced by the Examining Staff that a "reversal of parts and size" is obvious,¹⁹⁷ is unwarranted by the evidence of record. The reliance upon Nevada by the Examining Staff is misplaced; the citations of Nevada '127 to "miniaturization" are invitations by Nevada '127 to invent, and are directed to features such

¹⁹⁶ "The difference between the claimed invention and Gokcebay is Gokcebay fails to teach a bar/detent/blocking pin being engaged by a locking member which moves independently of the movement of the bar/detent which is reciprocated between a blocking and releasing position as a result of independent movement of the locking member via the electrical operator. Thordmark et al teach a cylinder having an electronic operator 12, a movable electronic locking member 11 which alternately allows and blocks reciprocation of a spring biased sidebar/detent 10 (col. 5, lines 38-47). Thordmark et al teach the electrically actuated blocking element being mounted in the cylinder shell and not the plug." *Examiner's Answer*, page 17.

¹⁹⁷ "It would have further been an obvious reversal of parts and change of size to select miniature logic circuitry and a miniature solenoid and locking member 11 such that the blocking mechanism fits within a conventional sized lock plug as taught by Gokcebay and Nevada. " *Examiner's Answer*, pages 18 and 19.

as the key,¹⁹⁸ rather than to the cylinder plug of Appellant's claims.¹⁹⁹ Moreover, the single fact that it was the single pioneer recognized by Gokcebay '777 who along departed from the industry convention of the cylinder lock industry as evidence by the numerous references of record, is dispositive evidence of the non-obviousness of claims 9, 10, 11 and 12.

¹⁹⁸ See, for example, Naveda '127 at column 4, lines 58-61, and column 9, lines 22-26 cited by the Examining Staff. Neither "miniaturization" nor the body of the key are defined by the pending claims, and for the issues before the Board, are not relevant to the proposed modification of the primary reference. This style by the Examining Staff is not helpful to completion of this compacted examination.

¹⁹⁹ "Naveda is applied to reinforce that one having ordinary skill in the art of electro-mechanical or magneto-electric lock systems would have known of the versatility and interchangeability of known electronic elements usable in verifying and actuating electric lock cylinders including among others, miniature coils, miniature electromagnets, electronic memories bioelectric circuits, resistance plates and the like (col. 3, line 1-13 and col. 4, lines 30-35). Furthermore, Naveda teaches that the electromagnet can be located in the receiver, or alternately, in the body of the key having any size or shape (col. 4, line 60, col. 9, lines 22-25). It would have been obvious to one of ordinary skill in the art at the time the invention was made to replace the simple blocking element of Gokcebay with the multi-part (detent 10 and locking member 11 therefor) electrically actuated blocking element of Thordmark et al to thwart natural attempts to force system locks that are equipped with electronic blocking functions, of the kind meant by Thordmark (col. 1, lines 38-42), by making forcing of such locks more difficult." *Examiner's Answer*, pages 18 and 19.

CONCLUSION

Addressing first, the issues raised by the Examiner's novel theory of "double patenting" presented in support of the rejection of claims 11 and 12, consideration should be given to the scenario contemplated by 35 U.S.C. §121 where a sequence of divisional patent applications are filed as a result of a requirement for restriction imposed by the Office, or as in *Boehringer Ingelheim Int'l v. Barr Laboratories, Inc.*, ___ F.3d ___ (Fed. Cir. 2010), multiple divisional applications are filed

"encompassing various combinations of claims comprising the
different inventions as being distinct in the restriction
requirement assessed against the ... [parent] application,"

an Appellant has satisfied the "as a result of" provision of 35 U.S.C. §121. Moreover, *Boehringer* observed that the safe harbor provided by 35 U.S.C. §121 applies,

"when the PTO issues a restriction requirement that leads to
more than two separate applications"

because 35 U.S.C. §121 "refers broadly to *a divisional application*, and does not state that the divisional application must be a direct divisional of the original application, but extends to applications "sharing a common lineage ... or to continuation applications of divisional applications."

First, there is no evidence of record of an absence of either (i) a lack of enablement the subject matter of claim 9 or 10 of (ii) an absence of a written description the subject matter of claim 9 or 10, or (iii) a failure to disclose the best mode for practicing the subject matter of claim 9 or 10.²⁰⁰ Under U.S. practice, “the examiner has the initial burden of presenting by a preponderance of evidence why a person skilled in the art would not recognize in an Appellant’s disclosure a description of the invention defined by the claims.”²⁰¹ That initial burden has not been met; consequently, in view of the satisfaction of the requirement for enablement of the phrases “distal member”, this rejection may not be sustained under the first paragraph of §112.²⁰²

Second, under *Geneva Pharmaceuticals, Inc. v. Glaxo SmithKline PLC*, 349 F.3d 1373, 68 USPQ2d 1865 (Fed.Cir. 21st November 2003), 35 U.S.C. §121 bars an obviousness-type double patenting rejection when (i) each claim of Appellant ‘601 patent appeared in the instant application, (ii) the Examiner actually imposed, maintained, and continues to maintain a requirement under 37 CFR §1.146 for an election of species, arguing that no generic claims were allowable, and (iii) Appellant’s filed a divisional application was filed to present claims which were indicated by the Examiner to be allowable in the above-

²⁰⁰ *High Concrete Structures, Inc. v. New Enter. Stone And Lime Co.*, 377 F.3d 1379, 71 USPQ2d 1948, 1951, WL 1689152 (Fed. Cir. 29th July 2004).

²⁰¹ *MPEP*, 8th Ed., Rev. 3 (August 2005) §2163, citing *Wertheim*, 541 F.2d 257, 263, 191 USPQ 90, 97 (CCPA 1976).

²⁰² Where the meaning of a claim is “reasonably discernable,” the claim is not indefinite. *Bancorp Servs., LLC v Hartford Life Ins. Co.*, 359 F.3d 1367, 69 USPQ2d. 1996 (Fed. Cir. 1st March 2004).

captioned application, and those claims were passed to issue in Appellant's '601 patent. This rejection of claims 11 and 12 may not therefore, be maintained under the doctrine of obviousness type double patenting.

Third, turning now to the issue of obviousness of claims 9 through 12 under 35 U.S.C. §103(a) over the Examining staff's proposed combination of Gockebay '777, Thordmark '274 and Naveda '127, 35 U.S.C. §103 requires consideration of whether the differences between the subject matter defined by each pending claim and the prior art are such that the "subject matter as a whole" would have been obvious? Under U.S. practice, "[t]he mere fact that the prior art may be modified in the manner suggested by the Examiner does not make the modification obvious unless the prior art suggested the desirability of the modification. *In re Fritch*, 972 F.2d 1260, 1266, n.14, 23 USPQ2d 1780, 1783-84, n.14 (Fed Cir. 1992), citing *In re Gordon*, 733 F.2d 900, 902, 221 USPQ 1125, 1127 (Fed. Cir. 1984). It is further established that the Examiner must make specific findings on a suggestion to combine prior art references. *In re Dembiczak*, 175 F.3d 994, 1000-01, 50 USPQ2d 1614, 1617-19 (Fed. Cir. 1999).

As demonstrated the by foregoing paragraphs, the Examiner has focused not on the subject matter of Appellant's claims as a whole, but has focused upon individual limitations. Ostensibly, the prior art relied upon by the Examiner endeavors to provide a lock that may be easily retrofitted. Gokcebay '777 however, requires that a bore 50 be drilled within the shell of the existing lock while Thordmark '274 requires that a separate V-shaped groove 3c that is spaced-apart and distinct from the slot for sidebar 7, be machined within the cylinder,

and that the entire recess shown in Figure 1 be machined into the shell.

Contrary to the Examiner's assertions, neither Naveda '127 nor Thordmark '274 nor Gockebay '777 advocates both insertion of an electrical operator into the cylinder plug and some interaction between that plug borne operator and a bar, elongated member or sidebar that is able to make simultaneous engagement of both the shell and cylinder plug, because:

- Gockebay '777 teaches only insertion of a solenoid within the cylinder,
- Gockebay '777 is wholly devoid of any bar (other than the armature 18 that is itself a part of solenoid 17),
- Gockebay '777 is wholly devoid of any bar that provides any type of engagement between the shell and cylinder,
- Thordmark '274 teaches nothing about insertion of any operator within the cylinder,
- both Gockebay '777 and Thordmark '274 require not only complete replacement of the cylinder, but major alteration of the shell in order to accommodate a retrofit,
- both Gockebay '777 and Thordmark '274 are utterly incapable of providing any interaction with their primary locking mechanical features, and
- Naveda '127 is singularly devoid of any teaching of a cylinder plug and discloses no primary mechanical locking mechanism as is required by both Gockebay '777 and Thordmark '274,
- Naveda '127 fails to describe how traveling coil 17, armature 18 and latching element 10 of Fig. 7 of Thordmark '274 incorporated into the plug of Gockebay '777.

Nowhere does the Examiner explain, and the art is silent, how the three parallel rotational members of Naveda '127, each of which requires a unique, spaced-apart axis of rotation, might be viewed to teach "miniaturization" of the single axis compact structures of the proposed combination. Of necessity, Naveda '127 teaches the antithesis of miniaturization asserted by the Examiner.

In contradistinction, Appellant's claims define a structure with an electrical operator borne by the cylinder plug, a member moving in response to the operator, and interaction between the operator and a side bar, elongate member or sidebar interposed between the shell and the cylinder plug. Although these differences may appear to be but a small advance in the art, the advantages flowing from these differences are substantial. For example, only Appellant's claims define a structure with an electronic operator borne by the cylinder plug that interacts with a side bar and that consequently, is able to advantageously both retrofit an installed lock by the expedient of replacing only the cylinder plug *without any* alteration of the shell and to *interact or cooperate with* an existing sidebar of a primary mechanical locking mechanism that is positioned between the shell and plug. The fact that both Gockebay '777 and Thordmark '274 are concerned with retrofitting of existing locks, a fact noted by the Examiner, and that both references require modification of the shell of the lock in order to complete that retrofitting, while Appellant alone provides a cylinder plug that may work with an existing sidebar and may be retrofit without any modification of the shell is a difference between the prior art and the structure defined by the pending claims that prevents the subject matter as a whole from being obviousness under 35 U.S.C. §103. This

deficiency in the Examiner's proposed combination is not remedied by Naveda '127. Moreover, this deficiency is highlighted by the fact that Thordmark '274 clearly avoids either teaching or suggestion of any interaction or cooperation between sidebar 7 and coil 17.

This interaction with the existing sidebar beneficially enhances the security provided by Appellant's lock. Neither Gockebay '777, Thordmark '274 nor Naveda '127, nor the Examiner's proposed combination of Gockebay '777, Thordmark '274 and Naveda '127 are able to provide these advantages. Moreover, the Examiner's proposed combination is incomplete and fails to make a *prima facie* showing of obviousness; how, for example, is the traveling coil 17, armature 18 and latching element 10 of Fig. 7 of Thordmark '274 incorporated into the plug of Gockebay '777? No details of such a combination are provided by the Examiner's proposed combination. Accordingly, in view of these differences between the pending claims and the prior art, "the subject matter as a whole" can not be found to be rendered obvious under 35 U.S.C. §103(a). In short, the Examiner has unfairly sought to limit the scope of coverage to which Appellant is entitled by reconstructing the art in an effort to meet the terms of Appellant's claims when none of that art suggests such a simple modification of the art as Appellant's electrical operator being both borne by and rotating with the cylinder plug *and* operating to block the travel of a sidebar. Evidence of that error in the formation of the Examiner's proposed combination lies in the fact that the proposed combination is depends upon a primary reference that discloses numerous embodiments of an invention, but none of those several embodiments derive any advantage from the modifications required to construct the Examiner's proposed combination; those

modifications simply produce a more cumbersome structure with more parts that accomplishes nothing that the primary reference does not achieve without those modifications. This is evidence of a lack of motivation in the art to make the modifications necessary to construct the Examiner's proposed combination, as well as evidence that the Examiner is simply using Appellant's claims as a blueprint in an impermissible effort to make a hindsight reconstruction of the art.

Perhaps the proposed combination of Gokcebay 777, Thordmark, *et al.* '274 and Naveda '217 was formed on the reverse side of the "looking glass", out of sight of the intrinsic limitations of the proposed combination, guided only by Appellant's contribution to the art, and without consideration of the pending claims in their entireties:²⁰³

- By way of example, the Examiner's proposed combination including Gokcebay 777 is not a pioneering patent. Gokcebay '777 itself teaches, at some length, that it is an improvement over Appellant's earlier U.S. Patent No. 5,140,317.²⁰⁴ Gokcebay '777 however, in seeking to improve upon Mr. Hyatt's, that is, the Appellant's, earlier efforts in the art, places a premium upon extreme compactness²⁰⁵ of his electronic access control that is physically

²⁰³ 35 U.S.C. §103(a) mandates consideration of the *subject matter as a whole* in a determination of obviousness. A point-of-novelty test is improper.

²⁰⁴ Gokcebay, *et al.*, '777, see the entirety of column 2, lines 7 through 54, devoted to an analysis by the Examiner's primary reference, of Appellant's earlier U.S. Patent No. 5,140,317.

²⁰⁵ Gokcebay, *et al.*, '777, see column 3, lines 1 through 5, as well as column 4, lines 39 through 41.

irreconcilable with the demands of the secondary references for unrestricted axial length of its “mutually independent lock functions.”²⁰⁶ The primary reference, in his efforts to follow the teachings of Appellant, concentrates his structure within his cylinder plug 24 to offer a structure “in an extremely compact fashion”²⁰⁷ for which “[n]o additional space is required to implement the system of the invention.”²⁰⁸ The Examiner’s proposed combination however, as represented by Thordmark, *et al.* ‘274 and Naveda ‘217, dwells wholly outside the cylinder plug and demands,

“a latching element 10 [the configuration of which] can vary within wide limits ... [and] its length may vary but preferably it exceeds half the axial length of the plug and may – as in the illustrated embodiments — often substantially correspond to the axial length of the plug.”²⁰⁹

This disharmony, attributable to both the radial versus axial orientation in the primary and secondary references, as well as to the gross differences in size relative to the cylinder plug in the primary and secondary references, and to

²⁰⁶ Thordmark, *et al.* ‘274, column 2, lines 66 and 67, and column 3, line 9.

²⁰⁷ Gokcebay, *et al.*, ‘777, see column 4, line 39.

²⁰⁸ Gokcebay, *et al.*, ‘777, see column 4, lines 41, 42. As taught by the primary reference, his lock “has an electronic access feature which occupies no more space than the mechanical lock itself. **Nothing** is required outside the lock cylinder ... **aside from** a small recess or bore [*i.e.*, bore 50] which is provided in the cylinder shell.” Gokcebay, *et al.*, ‘777, see column 3, lines 1 through 5.

²⁰⁹ Thordmark, *et al.* ‘274, see column 6, lines 18 through 25, together with column 4, lines 20 through 23.

the insistence of the primary reference that “[n]othing is required outside the lock cylinder”²¹⁰ versus the demand of the secondary references that all moving parts be required to be on the outside of the lock cylinder, is irreconcilable, and impermissibly prevents the primary reference from being practiced in its intended mode of operation, contrary to the practice under 35 U.S.C. § 103(a). Consequently, the primary reference may not be modified according to the teachings of the secondary references.

- By way of a second example, Gokcebay ‘777 dwells upon direct engagement between the cylinder plug and its surrounding shell in an effort to provide, “in an extremely compact fashion, electronic access control to a conventional mechanical lock”²¹¹ with “a bore or recess 50 [cut into cylinder shell 46] into which the blocking pin 38 extends in the blocking position.”²¹² In the Examiner’s proposed combination including Thordmark, *et al.* ‘274, the entirety of “latching element 10” having a certain axial length, “coacts with a blocking element” 11 which is “conveniently moved axially by means of an electric motor, an electromagnet, a solenoid ...” is encased within “a lock cylinder 2”, to indirectly engage “plug 3”; this entirety is taught by the Examiner’s proposed combination to be one of two, or more, “**mutually**

²¹⁰ Gokcebay *et al.* ‘777, see column 3, lines 2 and 3.

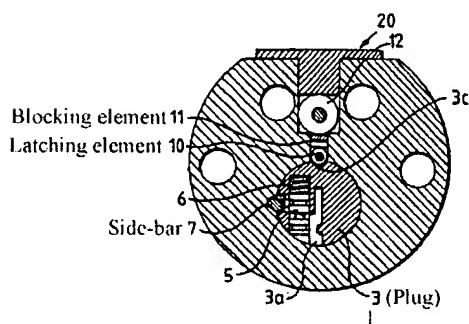
²¹¹ Gokcebay, *et al.*, ‘777, see column 4, lines 39 and 40.

²¹² Gokcebay, *et al.*, ‘777 see column 6, lines 45 through 48.

independent latching or blocking devices.”²¹³

Thordmark et al. U.S. Patent No. 5542274

Figure 3



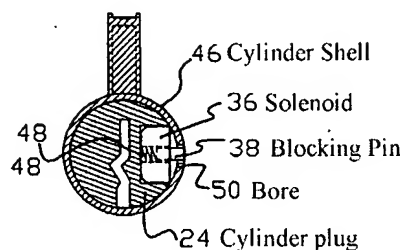
Completely absent from the Examiner’s proposed combination is any direct locking, or latching, or blocking function achieved between “lock cylinder 2” and “plug 3” with the direct engagement taught by the primary reference, because the proposed combination teaches that its electrically activated latching or blocking device is devoid of either structural or functional relation to “side-bar 7.”

This divergence by the secondary references from the teaching by the primary reference of a solenoid to achieve direct engagement between the cylinder plug 24 and bore 50 in the surrounding cylinder shell 46,

²¹³ Thordmark, *et al.* ‘274, column 2, lines 66 and 67, and column 3, lines 8 through 10.

Gokcebay et al. U.S. Patent No. 5552777

Figure 5

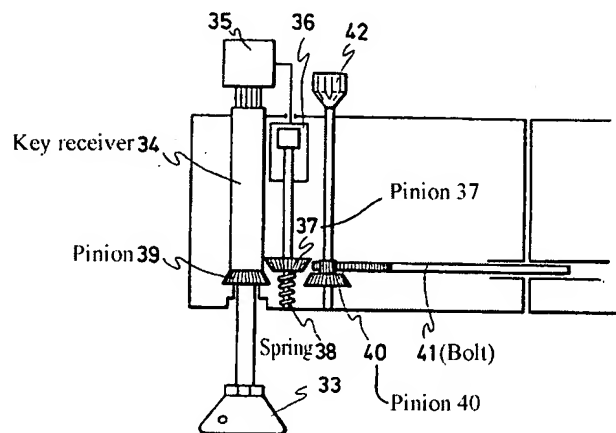


in addition to irreconcilability between the teachings of the primary reference on “extremely compact fashion” and the demand by the secondary references in the proposed combination for a latching element 10 of a certain axial length, deprives the prior art of all evidence of motivation for making the Examiner’s proposed combination. The various teachings of the several component references in the Examiner’s proposed combination are irreconcilable on the features defined by the finally rejected claims. Although the prior art may contain all of the constituent parts of the rejected claims, not only is that art devoid of motivation to combine those parts in the manner defined by these claims to cooperate in the relationships set forth by these claims, but the teachings of that art are irreconcilable on the precise points of mutual independence of lock functions, compactness and direct, versus indirect, engagement between the lock cylinder 2 and plug 3, where that art differs between the pending claims. In view of such advantageous results flowing from these differences such as Appellant’s preservation of compactness and enabling retro-fitting without a need to cut

a bore 50²¹⁴ into the shell in the manner required by the primary reference, these rejections may not be sustained under 35 U.S.C. §103(a).

- By way of further example, the Examining Staff makes much of the teaching in the Examiner's proposed combination including Naveda '127 in the proposed combination,

**Naveda U.S. Patent No. 4416127
Figure 10**



despite the fact that all, and every single one of the moving parts of Naveda '127, namely pinion 39, pinion 37, spring 38, pinion 40, bolt 41, and the various unnumbered shafts, are all located wholly outside the circumference of key receiver 34,²¹⁵ unlike the structure defined by the pending claims. At issue before the Examiner is what evidence of record provides motivation for incorporating the moving parts found on the exteriors of the structures in the

²¹⁴ Gokcebay, *et al.*, '777 see column 6, lines 45 through 48.

²¹⁵ See Figure 10, of Naveda '127.

secondary references into the interior of the cylinder plug? The primary reference itself, which limits “an electronic access feature ... [to occupancy of] no more space than the mechanical lock itself,”²¹⁶ may not be read to provide that motivation.

Turning now to consideration of exemplars of deficiencies of the evidence in the administrative record before the Examiner which were noted earlier in the paper, these deficiencies in the evidence must be considered under the criterion set forth by the Court in *In re Sang-Su Lee*, 61 U.S.P.Q.2d 1430 (Fed. Cir. 2002):²¹⁷

- By way of an additional example, the Examining Staff has sought to find motivation to incorporate the Thordmark, *et al.* ‘274 and Naveda ‘217 references into the structure of Gokcebay ‘777, despite the fact that Gokcebay ‘777, in teaching his improvements over Appellant’s ‘317 patent, twice teaches against a structure such as that of Naveda ‘217 where the lock’s system “would take up space within the ... lock casing adjacent to the lock.”²¹⁸

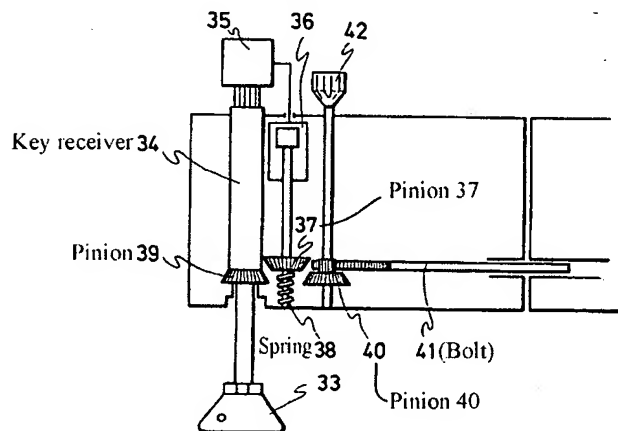
²¹⁶ Gokcebay, *et al.*, ‘777 see column 3, lines 1 through 6, together with column 2, lines 53 and 54, column 4, lines 40 through 43, and column 10, lines 10 through 15.

²¹⁷ “Our case law makes clear that the best defense against the subtle but powerful attraction of a hindsight-based obviousness analysis is rigorous application of the teaching or suggestion to combine prior art references. ... The need for specificity pervades this authority.” *In re Sang-Su Lee*, 61 U.S.P.Q.2d @1433 (Fed. Cir. 2002).

²¹⁸ See Gokcebay, *et al.*, ‘777, at col. 2, lines 39-40 (“the system of the patent [referring to Appellant’s earlier ‘317 patent] requires additional hardware within the lock casing ...”) and col. 2, lines 52-54 (“which avoids the need for electronics, solenoids or other hardware which would *take up space within the ... lock casing adjacent to the lock*”).

Despite this caution by the primary reference against structures such as that taught by Naveda '217, and despite the fact that all of the movable parts of Naveda '217 are in fact, located entirely within the lock's casing,

Naveda U.S. Patent No. 4416127
Figure 10



the Examining Staff seems convinced that Naveda '217 teaches the proposition that movable parts such as that taught by Thordmark, *et al.* '274 which are **also wholly external** to the cylinder plug, should be incorporated into the cylinder plug in the manner taught by Appellant's claims. The fact that the sole motivation for such a construction is found in Appellant's claims, is convincing indicia of obviousness *vel non*.

- By way of a second additional example, the Examining Staff has ignored the complete absence from the art of any motivation provided by either Thordmark, *et al.* '274 or Naveda '217, or by Thordmark, *et al.* '274 and Naveda '217 in combination, to incorporate into the cylinder plug of the

Examiner's proposed combination any constituent component other than the solenoid taught by the primary reference, and therefore lacks appellant's cooperation between an electrical operator borne by the cylinder plug and cooperating with a bar.

- By way of a third further example, the Examiner's proposed combination including Gokcebay '777 teaches that the embodiment illustrated in Figures 3, 4 and 5 "allows for secondary locking 'high security' mechanical features,"²¹⁹ but is utterly devoid of any teaching or suggestion for structural or functional cooperation between these "secondary locking 'high security' mechanical features" and his "conventional lock cylinder 20", while Thordmark, *et al.* '274 teaches "locks which include two or more **mutually independent** latching or blocking devices, of which one can be activated electrically"²²⁰ and "a lock of the kind ... which has two or more **mutually independent** lock functions",²²¹ and Neveda '127 teaches but a single magnetic lock. Only Appellant's claims, which when integrated into a conventional locking mechanism, advantageously both (i) recognize the innate deficiencies in locking structure devoted to preserving the mutually independency (as well

²¹⁹ Gokcebay, *et al.*, '777, column 6, lines 54 and 55.

²²⁰ Thordmark, *et al.* '274, column 2, line 66 through column 3, line 1.

²²¹ Thordmark, *et al.* '274, column 3, line 9.

as the secondariness of Gokcebay '777's "secondary locking"²²² of the lock functions in the prior art and (ii) provide "latching or blocking devices, of which one can be activated electrically"²²³ and, unlike the prior art, may be integrated to cooperate in reinforcing the locking function of both locking mechanisms,²²⁴ or alternatively, be selectively controlled to allow the mutual independency of the prior art.

- By way of a fourth example, the embodiment of Figures 3, 4 and 5 of the primary reference in the proposed combination teaches "a bore or recess 50 into which the blocking pin 38 extends in the blocking position."²²⁵ Incorporation of any component of the secondary references into the primary reference impermissibly destroys the ability of the primary reference to operate in its intended mode of operation with "bore or recess 50 into which

²²² Gokcebay, *et al.*, '777, column 6, line 54.

²²³ Thordmark, *et al.* '274, column 2, line 66 through column 3, line 1.

²²⁴ It is not customary in U.S. practice to define the advantages that result from a novel structure, such as those advantages provided by a structure such as Appellant's that flow from positioning an electrical operator to interact with a bar, detent or sidebar; the language of **Claim 64** expressly encompass such a structure and is worded to read: "said sidebar having a first portion that is positioned to be optionally block by another component of said lock functioning independently of said electrical operator to prevent said travel by said sidebar, and a second portion that is positioned to be blocked from said travel by said sidebar to said second position whenever said electrical operator is within said first orientation"

²²⁵ Gokcebay, *et al.*, '777, column 6, lines 44 and 46.

the blocking pin 38 extends,”²²⁶ because such an incorporation would inherently block bore 50. This inconsistency is further evidence of non-obviousness.

- By way of a fifth example, incorporation of any component of the secondary references into the embodiment of Figures 3, 4 and 5 of the primary reference in the proposed combination which teaches “a bore or recess 50 into which the blocking pin 38 extends in the blocking position”²²⁷ is a distortion of the teachings of the primary references because Thordmark, *et al.* ‘274 already teaches “a lock cylinder 2 which accommodates a plug 3 ... [and] a side-bar 7 [which] is able to move radially inward in the plug, so as to enable the plug to be rotated”²²⁸, and preserves that “side bar 7” entirely **mutually independent**²²⁹ from the operation of “latching element 10”, “blocking element 11”, “electric motor 12” and “electromagnet 17”, unlike the structure defined by the pending claims 9 through 12.
- By way of a sixth example, the Examiner’s proposed combination relies entirely upon electrically energy to move external blocking pin 38 of Gokcebay, *et al.*, ‘777, to move external blocking element 11 of Thordmark,

²²⁶ Gokcebay, *et al.*, ‘777, column 6, lines 44 and 46.

²²⁷ Gokcebay, *et al.*, ‘777, column 6, lines 44 and 46.

²²⁸ Thordmark, *et al.* ‘274, column 4, lines 57-66.

²²⁹ Thordmark, *et al.* ‘274, column 2, line 67, and column 3, line 9.

et al., '274 and to move external pinion 37 of Naveda '127. In contradistinction, Appellant relies is able to use the "torque that is externally applied to said plug and causes rotation of said plug within said shell." There is no evidence of motivation present in the record before the Examiner to modify the primary reference to rely upon externally applied torque to remove "blocking pin 38" from bore 50.

Consequently, there is no basis in the record for sustaining the final rejection of claims 9 through 12.

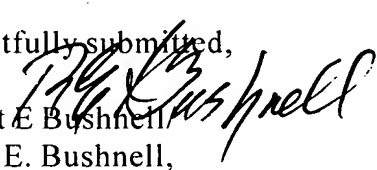
Moreover, an improvement made in such a very crowded and ancient art is further evidence of non-obviousness. Reversal of this rejection and allowance of claims 9 through 12 is respectfully urged.

Such action is respectfully requested.

In view of the above, it is submitted that the claims of this application are in condition for allowance, and early issuance thereof is solicited. Should any questions remain unresolved, the Examiner is requested to telephone Appellant's attorney.

In view of the law and facts stated herein as well as all the foregoing reasons, Appellant believes that the rejection is improper and respectfully requests that the Board refuse to sustain the outstanding rejection of claims .

Respectfully submitted,


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VIII. CLAIMS APPENDIX

Claims on Appeal (9-12)

1 9. (Previously Presented) A process of retrofitting a mechanical cylinder lock to
2 form an electromechanical cylinder lock, the process comprising steps of:

3 providing a mechanical cylinder lock including an outer shell with a bore having a
4 recess accommodating movement by a side bar, and a first rotatable barrel located in the
5 bore;

6 removing the first barrel from the shell;

7 providing an electronically powered rotatable barrel including:

8 a side bar preventing and permitting rotation of the barrel within the
9 bore in the shell;

10 an electromechanical locking member substantially entirely contained
11 within the barrel member, the electromechanical locking member being
12 positionable to permit the side bar to engage the locking member in a non-
13 barrel blocking position which permits the barrel to rotate with respect to the
14 shell, and the electromechanical locking member also being positionable to
15 place the sidebar in a barrel blocking position which blocks rotation of the
16 barrel with respect to the shell;

17 an electronically powered drive mechanism cooperating with the
18 electromechanical locking member to selectively move the locking member
19 from the barrel blocking position to the non-barrel blocking position in which
20 the side bar engages the locking member to rotate the barrel and operate the
21 lock; and

22 a controller carried by the barrel energizing the electronically powered
23 drive mechanism in response to an authorized attempt to open the lock; and

24 inserting the electronically powered rotatable barrel into the bore in the shell to form
25 an electromechanical cylinder lock.

1 10. (Previously Presented) A rotatable lock barrel for insertion into a lock cylinder
2 having a bore formed therein, the barrel comprising:

3 an elongated, generally cylindrically shaped barrel member having an exterior
4 configured for receipt in a bore of a lock cylinder and an interior containing an
5 electromechanical locking member, the barrel member having a recess formed therein;

6 wherein the locking member is disposed in the recess of the barrel member and is
7 substantially entirely contained within the barrel member, the locking member including a
8 groove;

9 the recess in said barrel member permitting a side bar to move into and out of
10 engagement with the groove of the locking member for selectively permitting and blocking
11 rotation of the barrel member with respect to a lock cylinder when positioned therein;

12 an electronically powered drive mechanism located within the barrel member moving
13 the electromechanical locking member to a position in which the groove of the locking
14 member is aligned to receive the side bar.

1 11. (Previously Presented) The process of claim 9, the process comprising steps of
2 providing at least one additional electromechanical locking member disposed in the barrel,
3 the additional electromechanical locking member being also positionable to permit the side
4 bar to engage the locking member in a non-barrel blocking position which permits the barrel
5 to rotate with respect to the shell.

1 12. (Previously Presented) The rotatable lock barrel of claim 10, comprising at least
2 one additional electromechanical locking member substantially entirely contained within the
3 barrel member, the additional locking member including a groove and being movable to a
4 position in which the grooves of the locking members are aligned to permit the side bar to
5 engage the locking member in a non-barrel blocking position which permits the barrel to
6 rotate with respect to the shell.

IX. EVIDENCE APPENDIX

References cited by both Appellant and the Examiner during examination of Appellant's co-pending U.S. Serial No. 08/720.070 and during examination of this Application.

Pursuant to 37 CFR §1.56, §1.97 and §1.98, and the guidance stated in §2001.06(b) of the *Manual of Patent Examining Procedure*, 8th Ed., Rev. 2 (May 2004), if an "application under examination is identified as a continuation divisional, or continuation-in-part of an earlier application, the examiner will consider the prior art cited in the earlier application." The following references are evidence that is a part of the administrative record of the prosecution history of this application:

U.S. References:

US 6,684,671 to Beylotte *et al.*, issued on 3 February 2004.²³⁰

US 6,615,625 to Davis, issued on 9 September 2003.²³¹

US 6,564,601 to Hyatt Jr., issued on 20 May 2003.²³²

US 6,552,650 to Gokcebay, *et al.*, issued on 22 April 2003.²³³

US 6,374,653 to Gokcebay, *et al.*, issued on 23 April 2002.²³⁴

²³⁰ Information Disclosure Statement, filed on 22 June 2004.
Information Disclosure Statement, filed on 24 September 2004.

²³¹ Information Disclosure Statement, filed on 22 June 2004.
Information Disclosure Statement, filed on 24 September 2004.

²³² Final Office Action (Paper No. 53, date mailed 13 June 2003).
Appeal Brief, filed on 3 June 2004.
Corrected Appeal Brief, filed on 18 October 2004.
Third Appeal Brief, filed on 25 October 2004.
Fourth Appeal Brief, filed on 18 April 2005.

²³³ Information Disclosure Statement, filed on 25 October 2004.

²³⁴ Information Disclosure Statement, filed on 25 October 2004.

US 6,363,762 to Kueng, issued on 2 April 2002.²³⁵

US 6,000,609 to Gokcebay, *et al.*, issued in December 1999.²³⁶

US 5,839,307 to Field, *et al.*, issued on 24 November 1998.²³⁷

US 5,839,305 to Aston, issued in November 1998.²³⁸

US 5,749,253 to Glick, *et al.*, issued in May 1998.²³⁹

²³⁵ Information Disclosure Statement, filed on 25 October 2004.

²³⁶ Information Disclosure Statement, filed on 14 January 2000.
Interview Summary (Paper No. 32, date mailed *unknown*).
Supplemental Amendment, page 24, filed on 24 April 2000.
Supplemental Amendment, page 24, filed on 25 April 2000.

²³⁷ Office Action and Notice of References Cited (Paper No. 17, date mailed 21 January 1999).
Second Supplemental Amendment, page 6, filed on 17 August 1999.
Amendment, page 6, filed on 16 March 2000.
Interview Summary (Paper No. 32, date mailed *unknown*).
Supplemental Amendment, page 26, filed on 24 April 2000.
Supplemental Amendment, page 26, filed on 25 April 2000.
Petition, page 2-3, filed on 26 April 2000.
Decision on Petition (Paper No. 36, date mailed 19 September 2000).
Corrected Decision on Petition (Paper No. 37, date mailed 11 October 2000).
Letter addressed to Examiner Boucher, date mailed and faxed on 6 March 2001.
Interview Summary (Paper No. 40, date mailed 30 March 2001).
Amendment filed on 13 April 2001.
Office Communication (Paper No. 52, date mailed on 13 June 2003).
Response, filed on 14 July 2003.
Amendment, page 39-42, filed on 3 June 2004.
Appeal Brief, filed on 3 June 2004.
Amendment, filed on 24 September 2004.
Amendment, filed on 18 October 2004.
Corrected Appeal Brief, filed on 18 October 2004.
Third Appeal Brief, filed on 25 October 2004.
Amendment, filed on 25 October 2004.
Fourth Appeal Brief, filed on 18 April 2005.

²³⁸ Information Disclosure Statement, filed on 14 January 2000.

²³⁹ Information Disclosure Statement, filed on 14 January 2000.

US 5,722,274 to Nakauchi *et al.*, issued on 3 March 1998.²⁴⁰
US 5,717,147 to Basch, *et al.*, issued in February 1998.²⁴¹
US 5,708,308 to Katayama, *et al.*, issued in January 1998.²⁴²
US 5,628,217 to Herrera, issued on 13 May 1997.²⁴³
US 5,614,703 to Martin, *et al.*, issued in March 1997.²⁴⁴
US 5,605,067 to Juan, issued in February 1997.²⁴⁵
US 5,605,066 to Hurskainen, issued on 25 February 1997.²⁴⁶
US 5,552,777 to Gokcebay, *et al.*, issued in September 1996.²⁴⁷

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- ²⁴⁰ Information Disclosure Statement, filed on 22 June 2004.
Information Disclosure Statement, filed on 24 September 2004.
- ²⁴¹ Information Disclosure Statement, filed on 14 January 2000.
- ²⁴² Information Disclosure Statement, filed on 14 January 2000.
- ²⁴³ Information Disclosure Statement, filed on 25 October 2004.
- ²⁴⁴ Information Disclosure Statement, filed on 14 January 2000.
- ²⁴⁵ Office Action and Notice of References Cited (Paper No. 17, date mailed 21 January 1999).
- ²⁴⁶ Information Disclosure Statement, filed on 22 June 2004.
Information Disclosure Statement, filed on 24 September 2004.
- ²⁴⁷ Office Action, page 3 and Notice of References Cited (Paper No. 7, date mailed 7 January 1998).
Office Action, page 3 (Paper No. 10, date mailed 5 February 1998).
Amendment, page 6 and 7, filed 5 August 1998.
Third (3rd) Supplemental Amendment, page 12, filed 23 October 1998.
Office Action, page 5 (Paper NO. 25, date mailed 17 August 1999).
Amendment, page 15-18, filed on 6 October 1999.
Supplemental Amendment, page 3 filed on 17 November 1999.
Substitute Amendment, page 17-20, filed on 30 November 1999.
Amendment, page 7-11, filed on 16 March 2000.
Supplemental Amendment, page 24-25, filed on 24 April 2000.
Supplemental Amendment, page 24-25, filed on 25 April 2000.
Petition, page 2-3, filed on 26 April 2000.
Decision on Petition (Paper No. 36, date mailed 19 September 2000).

US 5,542,274 to Thordmark, *et al.*, issued in August 1996.²⁴⁸

US 5,540,069 to Muller, *et al.*, issued on 30 July 1996.²⁴⁹

US 5,507,162 to Chhatwal, issued in April 1996.²⁵⁰

US 5,477,213 to Atarashi, issued on 19 December 1995.²⁵¹

Corrected Decision on Petition (Paper No. 37, date mailed 11 October 2000).
Office Action (Paper No. 39, date mailed 13 November 2000).
Interview Summary (Paper No. 40, date mailed 30 March 2001).
Amendment filed on 13 April 2001.
Office Action (Paper No. 47, date mailed 27 August 2002).
Amendment, page 70, filed on 24 January 2003.
Final Office Action (Paper No. 53, date mailed 13 June 2003).
Appeal Brief, filed on 3 June 2004.
Corrected Appeal Brief, filed on 18 October 2004.
Third Appeal Brief, filed on 25 October 2004.
Fourth Appeal Brief, filed on 18 April 2005.
Petition, page 2, filed on 5 October 2005.

²⁴⁸ Office Action and Notice of References Cited (Paper No. 7, date mailed 7 January 1998).
Amendment, page 12 and Information Disclosure Statement, filed on 5 August 1999.
Supplemental Amendment, page 12, filed on 6 August 1999.
Office Action and Notice of References Cited (Paper No. 25, date mailed 17 August 1999).
Office Action (Paper No. 39, date mailed 13 November 2000).
Interview Summary (Paper No. 40, date mailed 30 March 2001).
Amendment filed on 13 April 2001.
Office Action (Paper No. 47, date mailed 27 August 2002).
Amendment, page 70, filed on 24 January 2003.
Final Office Action (Paper No. 53, date mailed 13 June 2003).
Appeal Brief, filed on 3 June 2004.
Corrected Appeal Brief, filed on 18 October 2004.
Third Appeal Brief, filed on 25 October 2004.
Fourth Appeal Brief, filed on 18 April 2005.
Petition, page 2, filed on 5 October 2005.

²⁴⁹ Information Disclosure Statement, filed on 25 October 2004.

²⁵⁰ Information Disclosure Statement, filed on 14 January 2000.

²⁵¹ Information Disclosure Statement, filed on 22 June 2004.
Information Disclosure Statement, filed on 24 September 2004.

US 5,473,922 to Bair, *et al.*, issued in December 1995.²⁵²
US 5,469,727 to Spahn, *et al.*, issued in November 1995.²⁵³
US 5,423,198 to T.J. DiVito, *et al.*, issued on 13 June 1995.²⁵⁴
US 5,367,295 to Gokcebay, *et al.*, issued in November 1994.²⁵⁵
US 5,367,293 to Howard, *et al.*, issued on 22 November 1994.²⁵⁶
US 5,351,042 to Aston, issued in September 1994.²⁵⁷

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- ²⁵² Information Disclosure Statement, filed on 27 September 1996.
- ²⁵³ Office Action and Notice of References Cited (Paper No. 7, date mailed 7 January 1998).
Information Disclosure Statement, filed on 22 June 2004.
Information Disclosure Statement, filed on 24 September 2004.
- ²⁵⁴ New Application Specification, page 2, line 7-8 and Information Disclosure Statement, filed on 27 September 1996.
Amendment, page 12, filed on 5 August 1999.
Supplemental Amendment, page 12, filed on 6 August 1999.
- ²⁵⁵ Office Action and Notice of References Cited (Paper No. 7, date mailed 7 January 1998).
- ²⁵⁶ Office Action, page 3 (Paper No. 10, date mailed 5 February 1998).
Office Action, page 5 (Paper No. 25, date mailed 17 August 1999).
Supplemental Amendment, page 3 filed on 17 November 1999.
Substitute Amendment, page 17-20, filed on 30 November 1999.
Amendment, page 11, filed on 16 March 2000.
Office Action (Paper No. 39, date mailed 13 November 2000).
Amendment filed on 13 April 2001.
- ²⁵⁷ Information Disclosure Statement, filed on 27 September 1996.
Final Office Action (Paper No. 20, date mailed 8 February 1999).
Amendment, page 11, filed on 16 July 1999.
Amendment, page 11, filed on 5 August 1999.
Supplemental Amendment, page 11, filed on 6 August 1999.
Office Action, page 5 (Paper No. 25, date mailed 17 August 1999).
Office Action (Paper No. 39, date mailed 13 November 2000).
Interview Summary (Paper No. 40, date mailed 30 March 2001).
Amendment filed on 13 April 2001.

US 5,337,588 to Chhatwal, issued in August 1994.²⁵⁸
US 5,319,362 to Hyatt Jr., issued in June 1994.²⁵⁹
US 5,245,329 to Gokcebay, issued in September 1993.²⁶⁰
US 5,228,730 to Gokcebay, *et al.*, issued in July 1993.²⁶¹
US 5,218,188 to Hanson, issued in June 1993.²⁶²
US 5,206,637 to Warren, issued on 27 April 1993.²⁶³
US 5,148,691 to Walldén, issued in September 1992.²⁶⁴
US 5,140,317 to R.G. Hyatt, Jr., *et al.*, issued on 18 August 1992.²⁶⁵
US 5,131,038 to Puhl, *et al.*, issued in July 1992.²⁶⁶
US 5,089,692 to Tonneson, issued in February 1992.²⁶⁷
US 5,086,557 to Hyatt Jr., issued in February 1992.²⁶⁸

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- ²⁵⁸ Information Disclosure Statement, filed on 14 January 2000.
- ²⁵⁹ Information Disclosure Statement, filed on 27 September 1996.
- ²⁶⁰ Information Disclosure Statement, filed on 14 January 2000.
- ²⁶¹ Information Disclosure Statement, filed on 27 September 1996.
- ²⁶² Information Disclosure Statement, filed on 14 January 2000.
- ²⁶³ Information Disclosure Statement, filed on 22 June 2004.
Information Disclosure Statement, filed on 24 September 2004.
- ²⁶⁴ Information Disclosure Statement, filed on 27 September 1996.
- ²⁶⁵ New Application Specification, page 2, line 4-5 and Information Disclosure Statement, filed on 27 September 1996.
Third Appeal Brief, filed on 25 October 2004.
Fourth Appeal Brief, filed on 18 April 2005.
- ²⁶⁶ Information Disclosure Statement, filed on 14 January 2000.
- ²⁶⁷ Information Disclosure Statement, filed on 14 January 2000.
- ²⁶⁸ Information Disclosure Statement, filed on 27 September 1996.

US 5,038,023 to Saliga, issued in August 1991.²⁶⁹
US 5,010,750 to Boster, *et al.*, issued on 30 April 1990.²⁷⁰
US 5,003,801 to Stinar, *et al.*, issued in April 1991.²⁷¹
US 4,998,952 to Hyatt Jr., *et al.*, issued in March 1991.²⁷²
US 4,979,647 to Hassell, issued on 25 December 1990.²⁷³
US 4,939,915 to Vonlanthen, issued in July 1990.²⁷⁴
US 4,909,053 to Zipf III, *et al.*, issued in March 1990.²⁷⁵
US 4,891,636 to Rieker, issued in January 1990.²⁷⁶
US 4,864,292 to Nieuwkoop, issued on 5 September 1989.²⁷⁷
US 4,856,310 to Parienti, issued on 15 August 1989.²⁷⁸
US 4,854,619 to Nakauchi, issued on 8 August 1989.²⁷⁹

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- ²⁶⁹ Information Disclosure Statement, filed on 14 January 2000.
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X. RELATED PROCEEDINGS APPENDIX

None.

TO BE FILED with Appeal Brief

P56934

SUBSTITUTE SPECIFICATION

Preliminary Amendment filed on 7/29/03 has been incorporated

Serial No. ~~10/630,759~~

Attorney's Docket No. P56934



TITLE

ELECTROMECHANICAL CYLINDER PLUG

CROSS-REFERENCE TO RELATED APPLICATIONS

[0001] This application is a divisional application of Applicant's Serial No. 08/720,070 filed on 27 September 1996.

CLAIM FOR PRIORITY

[0002] This divisional application makes reference to, incorporated the same herein, and claims all benefits accruing under 35 U.S.C. §§119, 120 and §121 from provisional applications entitled *Electromechanical Cylinder Plug* earlier filed in the United States Patent & Trademark Office on the 29th of September 1995 and duly assigned Serial No. 60/004,594, and filed in the United States Patent & Trademark Office on the 12th of February 1996 and duly assigned Serial No. 60/011,764, and my co-pending application entitled *Electromechanical Cylinder Plug* filed in the U.S. Patent & Trademark Office on the 4th of February 2002 and duly assigned Serial No. 10/061,202 (which is now scheduled to be issued on the 20th of May 2003 as U.S. Patent No. 6,564,601), which is a divisional of my co-pending application entitled *Electromechanical Cylinder Plug* filed in the U.S. Patent & Trademark Office on the 27th of September 1996 and there duly assigned Serial No. 08/720,070.

FIELD OF THE INVENTION

[0003] This invention relates to access security systems generally, and more particularly, to electromechanical locks and to the plugs and cylinders of electromechanical locks.

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BACKGROUND ART

[0004] In an effort to both control and monitor access, state-of-the-art contemporary access security systems have begun to electrically couple the hardware of individual locks to a central, or host, computer. This enables the systems at a minimum, to monitor the operation of each lock and more commonly, to additionally control access to the space guarded by each lock by the expedient of controlling, or at least regulating operation of individual locks. Although some systems rely simply either wholly, or partially, upon recognition of a code borne by a pass, or credential, that contains a memory (*e.g.*, a magnetic strip or embedded memory chip) bearing a code unique to the pass, more elaborate systems such as the *ELECTRONIC SECURITY SYSTEM* of R. G. Hyatt, Jr., *et al.* disclosed in U.S. Pat. No. 5,140,317 issued on 18 August 1992, use both an electronic lock mechanism and an electronic key, both of which are provided with a microprocessor and a memory storing an identification code. More recent efforts such as the *DUAL CONTROL MODE LOCK* of T. J. DiVito, *et al.*, U.S. Pat. No. 5,423,198 issued on 13 June 1995, endeavors to further enhance access security by first having the blade of a key bearing the correct profile and bitting transmit an enable signal upon insertion into the keyway of a particular rekeyable locking mechanism, and then having a second coded signal electromagnetically displace one or more pin tumbler stacks to enable rotation of the plug relative to the cylinder.

[0005] It has been my observation that these access security systems tend to require complete replacement of each previously installed locking mechanism. I have found that this is not always feasible because some locks have a cylinder formed as an integral part of the secured item (*e.g.* a hospital drug cart), while other items and areas lack sufficient space to accommodate replacement of an existing mechanical lock with the larger volume of a contemporary electromechanical lock. Moreover, contemporary electromechanical lock systems typically require that each lock be electrically wired into a network with either a source of power or a data or control bus. While this is possible with many architectural

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1 applications and with secured items such as a coin box of a pay telephone, in other situations
2 I have found that either the remote location of the lock, the difficulty in stringing the
3 necessary wiring, or customs in the particular industry concerning placement of a lock on the
4 secured item, or area, make the installation of an electromechanical lock that is wired into
5 a network impractical.

6 **[0006]** I have also noticed that both the expense of the complete replacement of each
7 locking mechanism and the expense of the replacement electromechanical locking system
8 have limited the market for such systems to users where either enhanced security is
9 paramount (*e.g.*, hospital drug cabinets) or excess system costs are not a disadvantage
10 because the user (*e.g.*, a regulated utility such as a telephone company that installs
11 electromechanical locks on the coin boxes of its pay telephones) is able to claim an annual
12 return based upon the cost of savings generated by the system. I have discovered that
13 although both classes of users would be able to attain the same level of security from less
14 elaborate systems, the willingness of such users to readily bear these costs as well as the ages
15 old illusion of security concomitant with expense, has hidden the possibility of improving
16 upon current access security systems.

17 **[0007]** Moreover, I have found that despite their innate complexity, many contemporary
18 electromechanical lock systems are able to provide only a single level of access security; thus
19 the cost of equipping each user to use a particular lock remains the same - each user must
20 have the same expensive battery powered microprocessor controlled key, despite the fact that
21 different users of that lock may have different levels of access via that lock. Loss or damage
22 of the microprocessor controlled key can not, in my observation, be minimized by the owner
23 of the lock. Furthermore, electromechanical locking systems tend, because of their
24 excessively elaborate designs, to be unique to their manufacturers. Accordingly, users
25 become captive to their initially selected manufacturer. Consequently, other potential
26 classes of users subject to considerations of costs for replacement of existing locks, costs of

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the replacement systems as well as costs of operation of the replacement and costs of periodic repair and maintenance, have been denied the benefits of less expensive electromechanical locking systems able to provide the same level of access security, despite the fact that security is also a paramount concern of such users (e.g. a prison or other governmentally funded institution).

SUMMARY OF THE INVENTION

[0008] It is therefore, one object to the present invention to provide a more sophisticated electromechanical locking mechanism.

[0009] It is another object to provide a plug suitable to readily convert an existing locking mechanism into an electromechanical locking mechanism.

[0010] It is still another object to provide a replacement plug able to incorporate an locking mechanism into an electromechanical locking system.

[0011] It is yet another object to provide an electromechanical locking system able to accommodate a hierarchy of access security requirements.

[0012] It is still yet another object to provide lock components enabling retrofitting of an existing locking mechanism with an electromechanical locking mechanism, without requiring replacement of all of the components of the existing locking mechanism.

[0013] It is a further object to provide lock components enabling conversion of an existing locking mechanism into an electromechanical locking system, by replacing less than all of the components of the existing locking mechanism.

[0014] It is a still further object to provide an electromechanical plug that, with a minor alteration of a lock's cylinder, enables the lock to be incorporated into an electromechanical locking system.

[0015] It is a yet further object to provide an electromechanical lock able to be set to a plurality of operationally locked, unlocked, and partially bypassed conditions.

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1 **[0016]** It is a still yet further object to provide an electromechanical plug that enables each
2 lock to be individually set, either locally or remotely, to grant access to a secured item or
3 area in response to any one of a plurality of keys providing a plurality of different keys levels
4 of operational access. It is also an object to provide an electromechanical locking
5 mechanism having its electronic circuits and all of its electromechanical actuating elements
6 incorporated wholly into the body of a plug.

7 **[0017]** It is an additional object to provide an electromechanical locking mechanism that
8 is amenable for use both as one lock within an electrical network of electromechanical locks
9 and alone independently of any host electrical power or control network.

10 **[0018]** It is a still additional object to provide a drop-in substitute plug able to convert
11 contemporary cylindrical locks into electromechanical locks able to provide a plurality of
12 different levels of access security.

13 **[0019]** These and other objects may be achieved with a hierarchically adaptable lock using
14 a removable cylindrical plug rotatably held with a lock cylinder of a locking mechanism.
15 The plug has an exposed terminal face base perforated by a keyway and a distinct electrical
16 contact aperture. The plug contains either a mechanical locking mechanism, such as a
17 rekeyable tumbler stack, and an electrical operator, or simply a key retaining mechanism and
18 an electrical operator, wholly within the cylindrical exterior surface of the plug. The
19 opposite base of the plug operationally supports a tailpiece able to rotate a cam and position
20 a bolt of the locking mechanism. After insertion of a blade of a properly bitted and profiled
21 key, electrical power, or alternatively electrical power and a data signal superimposed upon
22 the electrical power, may be transmitted from electrical circuits of the key to the electrical
23 operator within the plug. Activation of the electrical operator within the plug, in conjunction
24 with correct displacement of the mechanical locking mechanism, or in the embodiments
25 constructed without a mechanical locking mechanism, simply activation of the electrical
26 operator, enables rotation of the plug within the cylinder as torque is manually applied to the

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blade of the key. An electronic memory, or an electronic memory and an electronic logic circuit wholly contained within the plug, may be electrically interposed between the electrical operator and the electrical contacts receiving power, or power and data signals, from the key.

BRIEF DESCRIPTION OF THE DRAWINGS

[0020] A more complete appreciation of this invention, and many of the attendant advantages thereof, will be readily apparent as the same becomes better understood by reference to the following detailed description when considered in conjunction with the accompanying drawings in which like reference symbols indicate the same or similar components, wherein:

[0021] Figure 1 is an exploded perspective view showing the details of a structure able to support several alternative embodiments of a lock constructed according to principles of the present invention;

[0022] Figure 2 is a top detailed view of an electrical operator of a type suitable for use in the embodiments shown in Figure 1;

[0023] Figure 3 is an enlarged cross-sectional detail view showing the structure of a first embodiment of a lock constructed according to the principles of the present invention;

[0024] Figure 4 is a top detailed view of one armature of an electrical operator of a type suitable for use in the embodiments shown in Figure 1;

[0025] Figures 5A and 5B are two enlarged cross-sectional detailed views showing two different operational positions of the structure of a second embodiment of a lock constructed according to the principles of the present invention;

[0026] Figure 5C is a side cross-sectional view of another embodiment, showing one phase of the operation of the lock;

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1 [0027] Figure 5D is a side cross-sectional view of the embodiment illustrated in Figure 5C,
2 showing another phase of the operation of the lock;

3 [0028] Figure 5E is a side cross-sectional view of one design for a motor suitable for use
4 in the embodiments shown in Figures 5A, 5B, 5C and 5D;

5 [0029] Figure 5F is a plan cross-sectional view taken along sectional line VF-VF' in
6 Figure 5E, of one detail of the motor shown in Figure 5C;

7 [0030] Figure 6 is a top detailed view of an armature for another electrical operator of a
8 type suitable for use in the embodiment shown in Figure 1;

9 [0031] Figure 7 is an enlarged cross-sectional detailed view showing the structure of the
10 embodiment incorporating the armature illustrated in Figure 6;

11 [0032] Figure 8A is an exploded perspective view of another alternative embodiment
12 constructed according to the principles of the present invention;

13 [0033] Figure 8B is an upper plan view of the embodiment illustrated in Figure 8A;

14 [0034] Figure 8C is a front elevational view of the embodiment illustrated in Figure 8A;

15 [0035] Figure 8D is a side elevational view of the embodiment illustrated in Figure 8A;

16 [0036] Figure 8E is a rear elevational view of the embodiment illustrated in Figure 8A;

17 [0037] Figure 8F is a cross-sectional view of an electrical operator of a type suitable for
18 use in the embodiment illustrated in Figure 8A;

19 [0038] Figure 8G is a cross-sectional view showing the assembly of the lock illustrated in
20 Figure 8A; ✓

21 [0039] Figure 8H is an exploded perspective view of another alternative embodiment
22 constructed according to the principles of the present invention;

23 [0040] Figure 9 is an upper plan cross-sectional view illustrating some of the details of the
24 embodiments of Figure 1;

25 [0041] Figure 10 is a front elevational view illustrating some of the details of the
26 embodiments of Figure 1;

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1 **[0042]** Figure 11 is a side cross-sectional elevational view illustrating some of the details
2 of the embodiments of Figure 1;

3 **[0043]** Figure 12 is a rear elevational view illustrating some of the details of the
4 embodiments of Figure 1;

5 **[0044]** Figure 13 is an enlarged cross-sectional detailed view showing the structure of an
6 alternative embodiment constructed according to the principles of the present invention;

7 **[0045]** Figure 14 is an oblique perspective view of an assembled alternative embodiment
8 constructed according to the principles of the present invention;

9 **[0046]** Figure 15 is a cross-sectional detailed view showing the structure of an alternative
10 embodiment constructed according to the principles of the present invention;

11 **[0047]** Figure 16 is an oblique view showing details of a case for a logic circuit that may
12 be incorporated into several of the embodiments of the present invention;

13 **[0048]** Figure 17 is an oblique view showing details of an alternative embodiment of a case
14 for a logic circuit that may be incorporated into several of the embodiments of the present
15 invention;

16 **[0049]** Figure 18 is a block diagram illustrating circuits for both a key and a lock,
17 constructed according to the principles of the present invention;

18 **[0050]** Figure 19 is a diagrammatic view illustrating one configuration of a hierarchical
19 lock cylinder system practiced according to the principles of the present invention;

20 **[0051]** Figure 20 is a diagrammatic view illustrating a second configuration of a
21 hierarchical lock cylinder system practiced according to the principles of the present
22 invention;

23 **[0052]** Figure 21 is a diagrammatic view illustrating a third configuration of a hierarchical
24 lock cylinder system practiced according to the principles of the present invention; and

25 **[0053]** Figure 22 is a diagrammatic view illustrating one configuration of a hierarchical
26 lock cylinder system practiced according to the principles of the present invention.

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DETAILED DESCRIPTION OF THE DRAWINGS

[0054] Turning now to the drawings, Figure 1 provides an exploded perspective view of a cylindrical camlock 100 of the type in general use for securing access to cabinet doors, drawers and coin boxes. The principles illustrated by camlock 100 are however, readily suitable for other types of locks. As shown in the various views of Figures 1 through 18, a camlock is assembled with an elongate, cylindrical plug 101 inserted inside the cylindrical cavity 102d of cylinder shell, or body, 102. Typically, lock 100 is constructed with end plate 68 at the terminal end of cylinder 102, recessed to receive face plate 72 of plug 101 so that the exposed surface of plug 101 lies flush with the face of plate 72. Absent such key retaining components (*i.e.*, those components of the plug that retain the shank of a key (*e.g.*, such as bitted key 200) within the keyway while the plug is rotated from its rest position relative to the shell 102) of the locking mechanism as cylindrical pins 101b and sidebar 101g, plug 101 should be sized to freely rotate around an axis that is parallel to the longitudinal axis of cavity 102d. Plug 101 contains an axially elongated keyway passage 101a shown in the front, cross-sectional and rear views of Figures 10, 11 and 12, respectively, extending axially through the exposed front plate 72 of cylindrical plug 101. Keyway passage 101a is configured to accommodate reciprocal insertion of the blade of a key 200 that has been correctly profiled to conform to the profile of keyway 101a. Although not essential to the practice of all embodiments of the principles of this invention, plug 101 may also contain a mechanical locking mechanism such as a set of pin tumblers 101b of the type mentioned in U.S. Patent Nos. 3,722,240 and 3,499,303 to Oliver. Pin tumblers 101b are biased by springs 101e into the bottom of corresponding pin chambers 82 by corresponding separate springs 101e restrained within the body of plug 101 by coverplate 101f fitted snugly into an axially extending slot 101y adjacent to the exterior circumferential surface of plug 101.

[0055] Plug 101 also contains sidebar 101g tapered into an acute (frequently blunted), axially extending bearing edge 101h partially recessed into a slot 102a formed axially along

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1 the exterior circumferential surface of cylinder 102. Sidebar 101g is typically biased radially
2 outwardly by one or more springs 101k so that the leading axially extending edge 101h of
3 sidebar 101g protrudes into a beveled slot 102a of a cylinder 102 encasing plug 101 after the
4 complete plug 101 has been installed into cylinder 102. Pins 101b are cut in this particular
5 embodiment with a groove 101d. When the blade of a mechanical key that has been bitted
6 to correctly displace pins 101b radially outwardly from keyway 101a within their
7 corresponding chambers 82 is inserted with the cuts of the land of the key precisely matching
8 the coding (axial separation between the upper and lower portions of pins 101b) of pins
9 101b, then slots 101d will align with the legs, or pegs, 101m of the sidebar 101g. When
10 rotational torque is manually applied to the key by the user, the beveled edges of slot 102a
11 enables sidebar 101g to move radially inwardly and away from groove 102a against the bias
12 of springs 101k slightly, but enough to allow plug 101 to rotate within cylinder 102, thus
13 concomitantly rotating tailpiece 101q which, in turn, rotates a movable cam 103 or other
14 member engaged by tailpiece 101q. In other applications, cam 103 may be connected to and,
15 upon rotation of plug 101 and its tailpiece 101q, draw a bolt and thereby permit access to a
16 secured item or into a secured area. Other embodiments allow a tailpiece 101q with a
17 particular shape to drive a clutch, cam or linkage.

18 **[0056]** The user may then rotate the key until plug 101 is aligned with a key extraction
19 point where alignment between chambers 82 and the corresponding tumbler pins 101b allows
20 the bias of springs 101k to force sidebar 101g radially outwardly until beveled edge 101h
21 mates with slot 102a, and thus permits withdrawal of key 200 from keyway 101a. A cylinder
22 lock of this type may have two or more grooves, or slots 102a spaced arcuately apart to
23 provide several arcuately separate points at which a key may be extracted from plug 101.
24 When pins 101b are engaged in the properly manufactured corresponding cuts in the blade
25 of the key and each of pins 101b is correspondingly radially displaced outwardly within its
26 chamber, and legs, or pegs, 101m of sidebar 101g engage corresponding circular grooves

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1 101d formed in some, or all, of pins 101b as those pins 101b are forced radially outward by
2 the bits of the key, the key may manually rotate plug 101 within the bore 102d of cylinder
3 102. The interengagement of pegs 101m and grooves 101d prevents radial movement of pins
4 101b and the concomitant release of the blade of the key within keyway 101a; the blade may
5 only be extracted from keyway 101a when beveled edge 101h of sidebar 101g is correctly
6 aligned with groove 102a. It should be noted that features of mechanical lock and key
7 mechanisms other than those mentioned in U.S. Patent Nos. 3,722,240 and 3,499,303 to
8 Oliver may be used in the practice of the instant

9 **[0057]** A release assembly such as a reciprocating solenoid coil 106b driving blocking
10 armature 106a shown in greater detail in Figures 2 and 3, or a rotary motor 108b driving
11 blocking armature 108a shown in greater detail in Figures 4 and 5A and 5F, or the
12 reciprocating solenoid coil 107b of blocking armature 107a shown in greater detail in Figures
13 6 and 7, resides within (typically cylindrical) chamber 80. The open distal end of chamber
14 80 is intersected by a circumferential groove 101ℓ which may partially, or completely,
15 encircle the exterior circumferential surface of plug 101. Coil 106b has a centrally located
16 hole 106f for receiving shaft 106d while detent 106A passes either sidewall 106e of blocking
17 armature 106a. Armature 106a forms the radially outward distal end of solenoid coil 106b,
18 and is radially outwardly biased by spring 106D so as to extend radially upwardly into the
19 path of groove 101ℓ and thereby engage detent 106A. Release assemblies 106, 107, and 108
20 are electrically connected to an electronic logic and control circuit 104b encapsulated within
21 an electrically insulated casing 104 formed to define an outer sector of cylindrical plug 101.
22 Power, or power, protocol, identification and control data may be transmitted from a key
23 inserted into keyway 101a via electrical conductor 104x, extending between an aperture 101n
24 in the face plate 72 of plug 101 and the electrical conductor (e.g., a local ground return)
25 formed by the electrically conducting parts forming keyway, respectively, and corresponding
26 input ports to circuit 104b. Electrical leads 104m, 104n, extend between a pair of output

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ports of circuit 104b and either solenoid coil 106c of blocking armature 106a, or solenoid coil 107c of blocking armature 107a, or motor coils 108c of rotary stepping motor 108a.

[0058] The electrical power or alternatively, electrical power, operational protocol, identification and control data passes through aperture 101n via conductor 104x when casing 104 is properly positioned within cavity 101p. Pegs 101s enter corresponding receptacles in casing 104 and position casing 104 relative to plug 101. When casing 104, and its electronic circuit, are seated within plug cavity 101p, casing 104 is contained within the larger diameter of plug 101, so that the combined plug assembly formed by plug 101 and electronic circuit casing 104 are easily and tightly received within the interior of lock cylinder 102. Blocking armature 106a, 107a or 108a, may be rendered ineffective at limiting or preventing rotation of plug 101 within cylinder 102 and thus considered to be mechanically bypassed until the installation of a cooperating member clip 107E or 106E, respectively within slot 102c with the respective detent 106A, 107A disposed within through aperture 102b. A selected one of cooperating member clips 107E or 106E installs circumferentially around cylinder 102 and is seated within a conforming circumferential groove 102c when blocking detent 107A or 106A is engaged through slot 102b. When installed properly, blocking detent 107A or 106A extends through slot 102b and sufficiently into the exposed recess 106c, or slot 107c, 108c in the distal end of the corresponding one of armatures 106a, 107a, 108a, and as plug 101 rotates within cylinder 102, blocking detent 107A, 106A travels through groove 101f around the circumference of plug 101. The shafts 106d, 107d or 108d respectively of blocking armatures 106a, 107a or 108a are made of a magnetically attracted material such as iron or steel. When an unidirectional electrical current is applied through the particular winding 106b, 107b, 108b, the corresponding shaft 106d, 107d, 108d will either axially reciprocate (*i.e.*, radially through its corresponding chamber 82) along axis A or incrementally rotate (*e.g.*, by ninety degrees within its corresponding chamber 82) around axis A and thereby alter the positional relation between

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blocking detent 106A or 107A relative to the corresponding blocking armature 106a, 107a or 108a.

[0059] In the embodiment illustrated by Figures 2 and 3, cooperating member clip 106E and blocking armature 106a are used as a set to form electromechanical release mechanism 106. When clip 106E is inserted into groove 101l with detent 106A protruding through slot 102b, compression spring 106D will hold armature 101a radially outwardly from the coaxial void 106f formed by coil 106b, so that cavity 106c will surround detent 106A. Consequently, sidewalls 106e will stand between detent 106A and circumferential groove 101l, thereby blocking rotation of plug 101 within cylinder 102. Assuming that mechanical key cuts (*i.e.*, the "bitting" along the shank of a conventional mechanical key 200) correspond with the coding of mechanical pins 101b, insertion of a key (not shown) into keyway 101a and manual rotation of the key in any direction is blocked by obstruction of detent 106A by stopface 106e; application of power to coil 106b via contact 104x and controller 104, and a responsive reciprocally downward movement of the magnetically attracted blocking armature 106a along axis A toward coil 106b enables the straight edge 106F of blocking detent 106A to clear the upper edge of stopface 106e and to pass freely in that direction within groove 101l. When power is discontinued to coil 106b, spring 106D will then return blocking armature 106a to its extended position, thereby again blocking rotation of plug 101 in any direction due to obstruction of detent 106A by sidewall 106e. If detent 106A is within groove 101l and is not axially aligned with cavity 106c when application of electrical power is withdrawn from coil 106b, continued manual rotation of the key will cause angular edge 107B of detent 107A to engage a slight chamfer on the upper edge of armature 107a at 107h; camming action of edge 107B will force armature 107a to axially reciprocate inwardly within its chamber 80 until detent 107A is again engaged by the return outward reciprocating movement of armature 107a under the bias of spring 107D. When detent 106A 107A is coaxially aligned with cavity 107c, springs 101k force edge 101h of sidebar 101g radially reciprocate

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1 outwardly from grooves 101d and into groove 102a, thereby enabling manual withdrawal of
2 the key from keyway 101a.

3 [0060] Turning now particularly to Figures 4, 5A, 5B, 5C, 5D, 5E and 5F, when
4 cooperating member clip 106E and blocking armature assembly 106a are used as a set to
5 form release mechanism 108, clip 106E will rest within cavity 108c, defined by two mirror
6 image and spaced apart sidewalls 108e in blocking armature 108a while plug 101 is in the
7 locked position relative to cylinder 102 with edge 101h of sidebar 101g resting within groove
8 102a. Blocking armature 108a is coaxially mounted upon the shaft of a stepping motor
9 108A. As represented in Figures 5A, 5B, 5C and 5D, the stepping motor has a single coil
10 108b; the embodiment shown in Figures 5E and 5F uses a pair of coaxial coils 108b. The
11 entire motor assembly is encased in a can 108j that is in turn, fitted into cylindrical hole 80.
12 Preferably, stepping motor 108A rotates by ninety degrees in response to application of
13 electrical current to coil, or coils 108b. Referring now to Figure 5A, assuming that upon
14 manual insertion of a key within keyway 101a, mechanical key cuts along the shank of the
15 key correspond to coding of the row of mechanical pins 101b, rotation of the key in either
16 direction is blocked by engagement of detent 106A with sidewalls 108e of cavity 108c in
17 blocking armature 108a. Turning now to Figure 5B, application of power to solenoid coil
18 108b and an accompanying rotation of blocking armature 108a around axis A relative to coil
19 108b in response to flow of the current, enables the straight lowermost edge 106F of
20 blocking detent 106A to pass through gap 108h between opposite sidewalls 108e of cavity
21 108c and to pass freely into groove 101e, thereby enabling rotation of plug 101 within
22 cylinder 102. When the key is withdrawn from keyway 101a, blocking armature 108a will
23 remain in its current position, thereby blocking rotation of plug 101 in either direction if the
24 current position is as shown in Figure 5A with sidewalls 108e interposed between groove
25 101e and detent 106A. If however, the current position of blocking armature 108a is as
26 shown in Figure 5B when the key is withdrawn, detent 106A will be able to freely rotate

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1 through gaps 108h and into groove 101l when another key with the correct bitting is inserted
2 into keyway 101a. If tab 106A and cavity 108g are significantly misaligned when power is
3 discontinued, then rotation of the plug 101 to the key extraction point where mechanical key
4 retaining pins 101b may disengage from the key blade due to the movement of sidebar 101g
5 into groove 102a, will position small tapered edge 106B to encounter chamber 108h. As
6 plug 101 is rotated farther, armature 108a is pushed into the void 108f coaxially defined by
7 coil 107b until tab 106A is again engaged by the return outward movement of armature 108a.
8 NMB Corporation currently manufactures a stepping motor, model number 03BJ-H001-F9
9 of a type that is sufficiently minaturized to serve in this embodiment. This model uses two
10 separately wound coils 108b. Application of electrical current to the coils incrementally
11 steps the armature 108a to align with the energized ferrous fingers 108n mounted upon the
12 casing and the ferrous fingers 108p mounted upon the ferrous divider 108q. An electrical
13 insulator 108k is mounted on shaft 108d to serve as a divider. Reversal of electrical polarity
14 to the coils will cause a reversal of the direction of rotation of armature 108a. Preferably,
15 each application of power to the coils will initiate a ninety degree rotation so that sidewall
16 108e will either block passage of detent 106A into groove 101l, or the alignment of slot 108h
17 with detent 106A will accommodate passage of detent 106A into groove 101l and thus enable
18 rotation of plug 101 within cylinder 102.

19 [0061] Turning briefly now to Figures 6 and 7, when cooperating member clip 107E and
20 blocking armature 107a are used as a set to form release mechanism 107, detent 107A of clip
21 107E will engage stopface 107e on blocking armature 107a, if plug 101 is rotated in one
22 direction. Assuming that the mechanical key cuts (*i.e.*, the "bitting" along the shank of a
23 conventional mechanical key) correspond with the mechanical pin coding, rotation in one
24 direction is blocked by stopface 107e and requires application of power to coil 107b and a
25 responsive reciprocally downward movement of the magnetically attracted blocking armature
26 107a toward coil 107b so that the straight edge 107F of blocking detent 107A clears the

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upper edge of stopface 107e and passes freely in that direction within groove 101ℓ. When power is discontinued to coil 107b, then spring 107D will return blocking armature 107a to its extended position, thereby blocking rotation of plug 101 in one direction due to obstruction of stopface 107e by detent 107A, while plug 101 is free to rotate in the opposite direction through groove 101ℓ. If plug 101 is rotated in this opposite direction far enough, angular edge 107B will engage a slight chamber on the upper edge of armature 107a at 107h; camming action of edge 107B forces armature 107a axially (radially within its chamber 80) inwardly until detent 107A is again engaged by the return outward movement of armature 107a under the bias of spring 107D.

[0062] Figures 8A through 8F illustrate the structure of two different drop-in modifications of a contemporary lock, one without requiring alteration of cylinder 102, and the second requiring a single radial hole into cylinder 102. An elongate, cylindrical plug 101 is axially inserted inside the cylindrical cavity 102d of cylinder 102. End plate 68 is recessed to receive face plate 72 of plug 101. Absent such components of the locking mechanism as cylindrical pins 101b and sidebar 101g, plug 101 should be sized to freely rotate around an axis B that is parallel to the longitudinal axis of cavity 102d. Plug 101 contains an axially elongated keyway passage 101a shown in the front, cross-sectional and rear views of Figures 10, 11 and 12, respectively, extending axially through exposed plate 72 of cylindrical plug 101. Keyway passage 101a is configured to accommodate reciprocal insertion of the blade of a key (not shown) that has been correctly profiled to conform to the profile of keyway 101a. Although not essential to the practice of all embodiments of the principles of this invention, plug 101 may also contain a mechanical locking mechanism such as a set of pin tumblers 101b. Pin tumblers 101b are biased into the bottom of corresponding pin chambers 101k by corresponding separate springs 101e restrained within the body of plug 101 by coverplate 101f covering chambers 80, 82, and fitted snugly into an axially extending slot 101y adjacent to the exterior circumferential surface of plug 101.

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*1 **[0063]** Plug 101 also contains sidebar 101g tapered into an acute (frequently blunted),
2 axially extending bearing edge 101h partially recessed into a beveled slot 102a formed
3 axially along the exterior circumferential surface of cylinder 102. Sidebar 101g is typically
4 biased radially outwardly by one or more springs 101k so that the leading axially extending
5 edge 101h of sidebar 101g protrudes into slot 102a of a cylinder 102 encasing plug 101 after
6 the complete plug 101 has been installed into cylinder 102. Pins 101b are cut in this
7 particular embodiment with a groove 101d, which may be made circular to accommodate
8 rotation of pins 101b during insertion of a key. When the blade of a mechanical key that has
9 been bitted to correctly displace pins 101b radially outwardly from keyway 101a within their
10 corresponding chambers 82, is inserted with the cuts of the land of the key precisely
11 matching the coding (axial separation between the upper and lower portions of pins 101b)
12 of pins 101b, then slots 101d will align with the pegs 101m of the sidebar 102g. When
13 rotational torque is manually applied to the key by the user, the beveled edges of slot 102a
14 enables sidebar 101g to move radially inwardly toward plug 101 and away from groove 102a
15 against the bias of springs 101k slightly, but enough to allow plug 101 to rotate within
16 cylinder 102, thus concomitantly rotating tailpiece 101q which, in turn, rotates a movable
17 cam 103 or other member engaged by tailpiece 101q.

18 **[0064]** The user may then rotate the key until plug 101 is aligned with a key extraction
19 point where alignment between chambers 82 and the corresponding tumbler pins 101b allow
20 the bias of springs 101k to force sidebar 101g radially outwardly until beveled edge 101k
21 mates with slot 102a, and thus permits withdrawal of the key from keyway 101a. Two or
22 more grooves, or slots 102a may be formed into the interior 102d, spaced arcuately apart to
23 provide several arcuately separate points at which a key may be extracted from plug 101.
24 When pins 101b are engaged in the properly manufactured corresponding cuts in the blade
25 of the key and each of pins 101b is correspondingly radially displaced outwardly within its
26 chamber 82, and pins 101m of sidebar 101g engage corresponding circular grooves 101d

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1 formed in some, or all, of pins 101b as those pins 101b are forced radially outward by the bits
2 of the key. The interengagement of pegs 101m and grooves 101d prevents radial movement
3 of pins 101b and the concomitant release of the blade of the key within keyway 101a; the
4 blade may only be extracted from keyway 101a when beveled edge 101h of sidebar 101g is
5 correctly aligned with groove 102a.

6 **[0065]** A release assembly such as a reciprocating solenoid coil 105b driving blocking
7 armature 105a resides coaxially within chamber 80. Coil 105b has a centrally located hole
8 105f for receiving shaft 105d when electrical current passes through coil 105b. Armature
9 105a forms the radially outward distal end of solenoid coil 105b, and is radially outwardly
10 biased by spring 105D so as to place a circumferential surface 105k to engage, and block, a
11 corresponding pin 101m of sidebar 101g. Release assembly 105 is electrically connected to
12 electronic logic and control circuit 104b encapsulated within electrically insulated casing
13 104 formed to define an outer sector of cylindrical plug 101. Power, or power, protocol,
14 identification and control data may be transmitted from a key inserted into keyway 101a via
15 electrical conductor 104x, extending between an aperture 101n in the face plate 72 and the
16 electrical conductor (*e.g.*, a local ground return) formed by the electrically conducting parts
17 forming keyway, respectively, or alternatively via two or more pairs of apertures 101n and
18 electrical conductors 104x, and corresponding input ports to circuit 104b. Electrical leads
19 104m, 104n, extend between a pair of output ports of circuit 104b and solenoid coil 105c of
20 blocking armature 105a.

21 **[0066]** Solenoid 105b enables an existing plug to be retrofitted simply by substituting
22 solenoid 105a in chamber 80 for one of tumbler pins 101b and a concomitant re-bitting of
23 the corresponding key to omit from the blade of the key any tooth corresponding to the
24 cylinder occupied by solenoid 105b, with application of electrical power to solenoid coil
25 105b radially forcing armature 105a radially outwardly against the compressive force of
26 spring 101e in order to align groove 105n with peg 101m. Alternatively, with a different

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1 location of groove 105n, solenoid 105b may be wound to draw blocking armature radially
2 downwardly into cylinder 80, against the compressive force of a spring 105D (not shown)
3 positioned between blocking armature 101a and coil 105b.

4 **[0067]** In a particular practice, the diameter of one of pin cylinders 80, 82 may not be
5 sufficiently wide to accommodate a particular solenoid and will require re boring of the
6 cylinder. The re bored plug can still be retrofitted into an already installed cylinder however,
7 without the necessity of removing cylinder 102.

8 **[0068]** Turning again to Figures 13 and 17, an existing plug and cylinder may also be
9 modified with the addition of an electromagnetic release assembly 109 to the exterior of
10 cylinder 102, and by radially boring one or more aligned apertures 102w, 101w through
11 cylinder 102 and into plug 101 to accommodate reciprocal passage of either one, or and array
12 of blocking armatures 109a. Power for solenoid coils 109b may be supplied and switched
13 by a source of electrical power external to the lock cylinder plug 102 via two or more
14 electrical leads 109E and an external contact assembly 109F which attaches circumferentially
15 around the outside of the cylinder shell 102 and custom multiple spring loaded pin armatures
16 109b passing through the apertures 102w bored into the wall of cylinder shell 102 and
17 entering into the corresponding blind apertures 101w bored into plug 101 to prevent rotation
18 of plug 101 relative to cylinder shell 102 even after the blade of a correctly bitted key had
19 precisely radially displaced the pin tumblers 101b. Installation of contact assembly is made
20 by spreading clip wings 109H apart enough to allow them to pass around cylinder shell 102
21 to enable contact guide boss 109J to seat into through aperture 102w and enter aperture
22 101w, and wing male catch 109G' is firmly engages female catch 109G. The harness 109E
23 is placed so as not to interfere with cam 103 and plug connector 109F may be connected to
24 an external power supply and switching device that is local to the site of the lock, or is
25 connected to a power and control bus to multiple locks.

26 **[0069]** Power may alternately supplied along with data through plug face contacts 104x

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1 which is connected to printed circuit 104b. Plug face contact 104x passes through face plate
2 72 from the cavity 101p to the outside exposed face of the plug via hole 101n. In this version
3 data and optionally power may be supplied by the user held door key. A logic circuit with
4 a microprocessor, communication, memory and switching means will be contained in casing
5 104 and its circuit 104b. When a key is presented and inserted in the lock and contacts on
6 the key are in electrical contact with contacts 104, a process of authentication and
7 comparison of encoded data occurs. An agreement of data will result in the logic circuit
8 switching power to coil 109b. In the event there is not an agreement of data then the lock
9 remains in its normal state.

10 [0070] Turning now to Figure 18, power for the coils 105b, 106b, 107b or 108b may be
11 supplied and switched by a source of electrical power such a battery 202 carried by a doorway
12 200 external to the lock cylinder plug 101 via one or more external contact assemblies 104x,
13 104y as are manufactured by a vendor such as Interconnect Devices, Inc. passing through
14 external contact window 101n, with contact 104x attached to printed circuit 104b. The
15 circuit board 104b is housed or encapsulated in circuit housing assembly 104 and is
16 electrically connected to coil windings 105b, 106b, 107b or 108b.

17 [0071] One hierarchy for a cylinder lock system is represented in Figure 19, using a
18 standard, mechanically bitted key 210 in conjunction with electromechanical key 200. In this
19 configuration, cylinder locks 211, 212 and 213 are stand-alone locks of the type using release
20 assemblies 105, 106, 107 or 108, that can be opened and closed with electromechanical key
21 200. Cylinder locks 214, 215 are electrically coupled to a host data and power bus and may
22 be opened and closed with either key 200 or with mechanical key 210, albeit the centrally
23 located controller 220 controls, and overrides where desired, access through locks 214, 215
24 via power and data bus 222. Cylinder locks 106, 107 are stand-alone mechanical locks and
25 may be accessed by either the correct mechanical bitting of electromechanical key 200 or of
26 mechanical key 210.

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1 [0072] Figure 20 illustrates a second hierarchy of a cylinder lock system in which
2 electromechanical key 200 providing its own electrical power is able to mechanically and
3 electrically unlock and lock stand-alone electromechanical locks 211, 212, 213 of the types
4 using release mechanisms 105, 106, 107, 108, while a different electromechanical key 209
5 is able to unlock and lock cylinder locks 214, 215 controlled by a central controller 220 via
6 a host power and data bus 222.

7 [0073] With the configuration illustrated in Figure 21, electromechanical key 200 is able
8 to unlock and lock all of cylinders 211, 212, 213, 214, 215, 216 and 217, and to set cylinder
9 213 into a bypassed state to enable mechanical key 209 to unlock and lock cylinder 213.

10 [0074] In the configuration illustrated in Figure 22, stand-alone locks 211, 212, 213 using
11 a bypassable release mechanism such as 108, may be set into a bypassed position by key 200
12 to allow a simple mechanically precisely bitted mechanical key 210 to unlock and lock these
13 cylinders, while either the same key 200 or alternatively host controller 220, is able to set
14 locks 214, 215 into a condition enabling key 210 to unlock and lock those cylinders.
15 Mechanical locks 216, 217 may be independently accessed by key 210.

16 [0075] The foregoing details describe an electromechanical locking system using a plug
17 constructed with a first base bearing a keyway providing a first electrical conductor and an
18 orifice spaced-apart from and separated by a mass of the plug from said keyway; a second
19 base separated by an axial length of the plug from said first base, said second base bearing
20 a tailpiece for supporting a cam; an exterior surface extending between and engaging the first
21 base and the second base; a locking mechanism responsive to a key inserted into said keyway
22 to accommodate rotation of the plug relative to a cylinder surrounding the plug when the key
23 while inserted into the keyway engages in a selected relation with the locking mechanism and
24 engaging the cylinder absent the selected relation; a second electrical conductor terminating
25 with an electrical contact exposed to an exterior of the first base through the aperture; an
26 electronic logic circuit coupled to receive electrical power and data signals via the first and

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1 second electrical conductors, and generating control signals in dependence upon the
2 electrical power and data signals; and an electrical operator having a distal member
3 travelling in dependence upon the control signals between a first position relative to the
4 exterior surface enabling rotation of the plug in relation to a cylinder surrounding the plug
5 and a second and different position relative to the exterior surface obstructing the rotation
6 of the plug in relation the cylinder.

7 **[0076]** The plug of this system is constructed with the locking mechanism, logic circuit
8 and electrical operator simultaneously experiencing the rotation relative to the cylinder
9 whenever the plug rotates relative to the cylinder. The plug is constructed with the locking
10 mechanism, logic circuit and electrical operator being wholly within the cylinder and
11 travelling with the plug whenever the plug moves relative to the cylinder. The plug is
12 configured with the electrical operator maintaining the distal member within the plug with
13 the distal member extended not beyond the exterior surface while the distal member is in the
14 first position, and maintaining the distal member in engagement with the cylinder while the
15 distal member is in the second position. The electrical operator maintains the distal member
16 within the plug with the distal member extending not beyond the exterior surface while the
17 distal member is in the first position, and moves the distal member radially between the first
18 position inside the exterior surface and the second position radially beyond the exterior
19 surface, in dependence upon the control signals.

20 **[0077]** Alternative construction of these features is possible without departing from the
21 principles of the present invention. For example, the plug used in Figure 1 to illustrate the
22 foregoing principles is described as having a tailstock configured to support a cam. In some
23 configurations, the plug may be configured to drive either a locking mechanism or an
24 electrical switch.